

Diabetes Working Group

White Paper

Avalere Health LLC on behalf of the Diabetes Working Group
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Executive Summary

Given the high and growing prevalence of diabetes, the chronic nature of the disease, lack of success in achieving desired patient outcomes, and the high cost of treating complications resulting from poor diabetes control, the barriers to providing optimal diabetes care must be brought to the forefront of the national healthcare discussion.

Many obstacles to achieving optimal diabetes care exist, including patient barriers (behavioral, psychosocial, and socioeconomic), structural and technological hurdles, and provider and delivery system concerns, among others. While all interconnected and important, the Diabetes Working Group (DWG) was formed in 2009 to focus on one crucial aspect of this problem – provider and delivery system barriers to diabetes treatment.

The DWG's focus on provider barriers addresses a gap in the current research on improving diabetes care. There are many organizations and initiatives focused on patient, structural, and technological barriers, and these efforts are of the highest importance. However, efforts surrounding provider barriers are limited, and unless this barrier is addressed along with the others, it will be impossible to achieve the objectives of improving patient care and outcomes.

Through new research sponsored by the DWG, this white paper examines provider barriers to offering the current standards of diabetes care and offers recommendations to mitigate these barriers. To better understand these issues, the DWG undertook the following initiatives:

- A comprehensive literature review of peer-reviewed articles on current standards of diabetes care, outcomes evidence, and current health economics data of diabetes care and treatment;
- A provider survey fielded to a large sample of diabetes care providers in the United States, with an objective of identifying barriers for diabetes providers to providing optimal diabetes care; and
- A theoretical Standards of Care Delivery Model designed to estimate the necessary resources to consistently deliver the current standards of care to diabetes patients in the United States. The model illustrates the gap between the current provision of care and what is needed to improve patient outcomes to meet current guidelines.

The data from these efforts provide the framework for potential solutions that can help providers more consistently meet the standards of care and thus achieve the ultimate objective— helping more patients with diabetes achieve optimal outcomes. In the remainder of this paper we explore identified issues that may affect providers' ability to provide optimal diabetes care and offer a series of recommendations to overcome the provider barriers identified to better enable diabetes providers to help their patients achieve optimal outcomes.

Provider Survey

The objectives of the provider survey were to measure how diabetes providers use and meet established standards of diabetes care and identify any barriers to meeting those standards when treating patients. The survey was also designed to clarify any trends among the barriers across certain provider characteristics, such as provider type and practice size.

The provider survey was a qualitative internet-based survey, which yielded complete responses from 1,056 diabetes care providers. Each survey provided characteristics about survey participants and information on the barriers they face when working to provide optimal diabetes care. This analysis also provided information on the amount of non face-to-face time spent with patients, how often providers train patients to test and monitor blood glucose levels, how often providers use the team approach, and information specific to pediatric diabetes care.

The survey demonstrates that providers in the diabetes community recognize the importance of standards-based diabetes care, yet also notes that most patients with diabetes are not receiving such care. In fact, many obstacles arise in achieving optimal diabetes care, and providers face many of these barriers on a daily basis. The results of this extensive provider survey illustrate five provider-specific barriers – patient adherence, time with patients, compensation for care, team coordination, and care management – most critical to their ability to provide patients with diabetes the care and treatment required to meet current standards (Figure ES-1).

Figure ES-1: Ranking of Barriers to Meeting Standards

	First	Second	Third	Fourth	Fifth
Patient Adherence	443	122	65	17	10
Time with Patient	72	186	113	38	8
Compensation for Care	64	88	76	35	11
Team Coordination	40	81	75	50	17
Training	5	17	17	11	2

Patient adherence and time with patients were highlighted by survey responders as two of the most prevalent barriers faced when providing standards-based care. These barriers are interrelated in that patients' ability to meet their treatment goals and adhere to their prescribed plans of care can be directly affected by the amount of guidance and education received from their health care team, which requires time.

The survey results suggest that the current system of diabetes care fails to yield providers the time required to achieve standards-based care and treatment. The persistence of these

barriers, coupled with the growth in prevalence of diabetes, make resolving these barriers to provider care imperative.

Standards of Care Economic Model

The objectives of the Standards of Care Economic Model were twofold: 1) to build a theoretical model to estimate the resources necessary for providers to consistently deliver the current standards of care to diabetes patients in the United States and 2) to evaluate provider costs to meet the standards and patient outcomes specified in diabetes care guidelines relative to current reimbursement for these services.

To establish the current standards, three sets of multi-part national standards for diabetes care were combined and the duplicates removed to produce the consolidated set of 26 standards of optimal care in this analysis. Three additional activities were identified that are not standards *per se*, but which are required in order to achieve the care standards, for a total of 29 activities.

A matrix of health professionals rendering the care needed to achieve the standards was developed, including physicians (adult and pediatric, general and specialty care), certified diabetes educators, registered dietitians, registered nurses, physician assistants, medical assistants, eye care professionals, mental health professionals, podiatrists, clinical laboratory personnel, and smoking cessation professionals.

This model was then applied to six clinical vignettes, three patients with type 2 diabetes and three with type 1 diabetes. Variations between the patient vignettes include age, duration of diabetes, medications, and comorbidities.

The model incorporates time estimates based on base case and best case estimates for each activity. Base case is defined as the amount of time required assuming a mix of patient complications, non-optimal patient/caretaker adherence, and possible administrative delays (e.g., delays in scheduling, paperwork, etc.). Best case is defined as the amount of time required to provide standards-based care assuming optimal patient/caretaker adherence, no patient complications, and no administrative delays.

The two primary components of the model are provider costs and provider reimbursement. The difference between provider costs and reimbursement was calculated to determine the reimbursement gap for providing standards-based diabetes care, based on Medicare reimbursement rates and then adjusted to approximate the average payer mix expected for a group of patients.

The total reimbursement amount was compared to the total provider cost figure and any differences noted as a “reimbursement gap.” Two reimbursement gap amounts were calculated, one using the base case Provider Cost estimate and the second using the best case Provider Cost estimate.

For most types of patients with diabetes, there is a gap between provider costs and reimbursement for treating patients with diabetes according to accepted standards. Provider costs exceed reimbursement for all of the patient vignettes when the base case provider time

estimates are used. Baseline model results show a gap between provider costs and reimbursement of \$121 - \$829 per patient, per year, depending on characteristics of the patient. Using the best case provider time estimates, baseline model results show that reimbursement exceeds provider costs for five of the six patient scenarios, by amounts ranging from \$28 to \$243 per patient, per year. Provider costs exceed reimbursement in the baseline model for the adolescent with type 1 diabetes even when the best case time estimates are applied.

Under the base case scenario, the costs for treating diabetes patients in an average adult practice would exceed reimbursement by more than \$750,000 per year. For an average pediatric practice, costs would exceed reimbursement by more than \$471,000 per year. These gaps are increased for patients using intensive management technologies such as CSII and CGM. The model is highly sensitive to assumptions about reimbursement for diabetes-related services, particularly for physician office visits. The gap between provider costs and reimbursement is substantially increased when current endocrinology office visit reimbursement patterns are assumed.

The provider survey suggests that patient adherence, time with patients, and compensation for care are the top three provider barriers to achieving optimal diabetes care. The results of this modeling study support providers' perceptions that compensation for optimal diabetes care is inadequate, given the gap between provider costs and reimbursement for providing diabetes care consistent with national standards.

Even using conservative assumptions regarding reimbursement, model results suggest that provider costs greatly exceed reimbursement for most patients when standards-based care is provided. This creates an untenable scenario in which providers are financially unable to meet the established standards of diabetes care to optimize blood glucose control and prevent or delay costly and debilitating complications. It is therefore imperative that alternatives to the current reimbursement system are explored and implemented to ensure that diabetes providers are able to provide the services necessary to obtain optimal diabetes patient outcomes.

Recommendations

Three key provider barriers to optimal diabetes care emerged from the original research conducted by the DWG through the provider survey and economic model: time with patients, inadequate reimbursement, and patient adherence. The white paper provides recommendations on overcoming these key provider barriers to optimal diabetes care. Recommendations are arrayed across three areas of provider engagement: care management, payment reform, and workforce supply.

Care Management

Patient adherence with diabetes self-management can be enhanced with improved provider focus on care management. Recommendations include the following:

- *Increase use of shared decision-making opportunities with patients in the office setting to maximize patient engagement in self-management of diabetes.* Because diabetes is essentially a self-managed disease, patients need to find motivation to actively participate in their treatment. To help address the patient adherence barrier cited in the provider survey, providers can help patients become more active in their own care by proactively incorporating a shared decision-making approach as they explain the treatment options and recommendations.
- *Leverage existing HIT tools fully to assist patients in diabetes self-management and track performance.* Providers can incorporate a variety of HIT tools into their practices that can help their patients to stay engaged and adhere to their treatment plan, including electronic prescribing and participation in registries. Existing technology is promising but not perfect, particularly in addressing the specific challenges facing diabetes providers. Therefore, funding and training to support their implementation will be critical to achieve wide-spread adoption.
- *Create strong provider teams and share roles and expectations with patients.* The benefits of this team approach are numerous. Studies show that short-term benefits can include reduced hospital inpatient stays and reduced rates of hospital readmissions and related costs;¹ long-term benefits include lower A1C values and reductions in eye disease, kidney disease, and nerve damage.² To build and implement diabetes care teams broadly, providers can look to their professional societies to define those aspects of the standards of care within their responsibilities, then build collaborative relationships with other team providers and societies to align their goals and objectives.

Payment Reform

The provider survey and economic model completed for this white paper both reveal barriers that could be significantly reduced through reforms to current fee-for-service payment systems. A broad spectrum of payment solutions is necessary to fully address provider barriers. A payment system that rewards spending the time necessary to optimally manage a patient's care, whether face-to-face or remotely, would create more rational alignment between economic incentives and desired patient outcomes, and would help address key provider barriers related to time with patients and compensation. Moreover, a payment system that improves outcomes such that diabetes complications can be avoided has the potential for enormous long-term cost savings for the health care system.³

Specific recommendations include the following:

- *Appropriately reimburse providers for meeting standards of care in treating their patients by paying adequately for all services delivered.* Appropriately reimbursing providers for delivering optimal diabetes care can address key provider barriers related to lack of time and compensation and will increase the number of diabetes patients who have access to optimal care. To achieve this objective under the current fee-for-service system, it is essential that billing codes exist to describe the work being performed by diabetes providers and that the codes describing diabetes care are covered and paid adequately. Appropriately aligning reimbursement rates with the actual care delivered to patients can eliminate significant barriers in helping patients best manage their diabetes. Recalibrating the baseline reimbursement for delivering optimal diabetes care is also important to the success of any new payment and care delivery model for diabetes, as those payment models will likely build off of existing fee-for-service payment rates.
- *Test and implement payment models that reward providers for supplying optimal care to patients with diabetes.* Payment models that hold promise for diabetes include episode of care payment, patient management fees (i.e., a monthly per-patient payment for all care, including extensive care coordination, education, and training services required to successfully manage patients with diabetes), and a diabetes-focused patient-centered medical home model.

Workforce Supply

To increase the amount of provider time with patients and to expand patient access to a variety of providers across a comprehensive care team requires addressing a third key area: provider workforce supply. If workforce issues are not addressed, it is unlikely that other efforts to improve diabetes care by alleviating provider barriers will be successful. Diabetes care providers identified lack of time with patients as a central obstacle to providing optimal diabetes care. Unless more providers are available to spend time with diabetes patients to assist them in becoming proficient in self management, this barrier will persist. Recommendations include the following:

- *Work to make diabetes care an attractive choice for new medical professionals through educational loan forgiveness.* Educational expense is a significant burden for many health care professionals, and the reputation of diabetes care as an underpaid profession may dissuade providers from seeking to enter that specialty as they face looming debt repayment. Educational loan forgiveness programs for diabetes professionals could be implemented by a number of state and federal government agencies as well as private sector organizations, including federal health care agencies such as the Health Resources and Services Administration, which currently operates several such programs, and state medical societies. Educational institutions could implement loan forgiveness programs for their graduates that choose to specialize in treating patients with diabetes and funding could be sought from non-profit foundations and trusts.

- *Promote the importance of providing optimal diabetes care as an essential aspect of the healthcare system.* Another key step to making diabetes care the career of choice for nursing, nutrition, and medical students is for current diabetes care professionals to promote the positive attributes of working with diabetes patients. Professional societies for diabetes care providers should work with medical schools and allied health professional training programs to increase students' exposure to the positive attributes of working with diabetes patients, including creating outreach programs for current diabetes professionals to share the positive aspects of their experience with students.
- *Expand access to diabetes modules to educate primary care providers on treatment of diabetes.* The vast majority of people with diabetes receive their healthcare from primary care providers and not diabetes specialists. Endocrinologists, diabetes educators, and other diabetes specialists can work to develop trainings for various healthcare professionals to provide them with the skills necessary to engage in shared decision making with their diabetes patients, appropriately manage diabetes treatments including insulin therapy, and to form comprehensive diabetes care teams for their patients. This training approach will expand the skills of existing healthcare professionals and reduce the diabetes workforce supply issues independent of adding additional providers to the system.

Background and Role of the Diabetes Working Group

Background

The Centers for Disease Control and Prevention (CDC) estimated in 2010 that 26 million people in the United States (U.S.) suffer from diabetes, representing 8 percent of the U.S. population and growth of over 3 million people over a two year period. The majority of these individuals, 90-95 percent of the total diabetes population, had type 2 diabetes; rates for patients with type 1 diabetes were estimated at between 5 and 10 percent. Beyond those diagnosed with diabetes, an additional 79 million people were estimated to have pre-diabetes, a condition with a risk for developing diabetes. The burden of diabetes continues to grow, with recent estimates of people with diagnosed and undiagnosed diabetes increasing to 44.1 million by 2034.⁴

With the increasing prevalence of diabetes, adequate treatment is more important than ever. Central to the management of diabetes is glycemic control through a combination of medication and self-management activities. From a medication perspective, people with type 1 diabetes require insulin delivered via injection or pump, while people with type 2 diabetes can often help control their blood glucose levels by taking oral medication. In addition to proper medication adherence, a strong self-management component requires active participation from the patient and healthcare delivery team. Healthy eating, exercise, and consistent monitoring of blood glucose levels are all areas that people living with diabetes must embrace to achieve optimal glycemic control. This individualized self-management yields significant health disparities among patients with diabetes and therefore requires appropriate and timely training, monitoring, and follow-up from healthcare professionals to ensure proper treatment for achieving optimal outcomes, including avoidance of costly and debilitating complications.

Glycemic control is measured primarily by an individual's A1C level. Clinical guidelines for diabetes management highlight a target A1C range of 6.5 – 7.0 percent. However, despite recognition of the growing diabetes population and the importance of appropriate treatment for them, it is also well recognized that many patients with diabetes are not achieving desired levels of glycemic control and outcomes. In fact, just over half (56.8 percent) of the diabetes population achieved a target A1C less than 7.0 percent, further reflecting the wide range of health disparities among this population.⁵

Studies have demonstrated that optimal treatment and management can improve glycemic control and reduce long-term complications in patients with type 1 and type 2 diabetes, both of which have been demonstrated to improve patient outcomes and reduce costs.^{6,7,8} For example, for every point higher in A1C, type 1 patients are 40 percent more likely, and type 2 patients are 25 percent more likely, to suffer long-term complications.^{9,10,11}

These issues – the high and growing prevalence of diabetes, the chronic nature of the disease, lack of success in achieving desired patient outcomes, and the high cost of treating complications resulting from poor diabetes control - fall soundly within the focus of the payment

and delivery system reforms created by the 2010 passage of the Affordable Care Act (ACA).¹² Given the magnitude of diabetes in terms of morbidity, mortality and cost, the barriers to providing optimal diabetes care must be brought to the forefront of the national healthcare discussion.

Role of the Diabetes Working Group

Many obstacles to achieving optimal diabetes care exist, including patient barriers (behavioral, psychosocial, and socioeconomic), structural and technological hurdles, and provider and delivery system concerns, among others. While all interconnected and important, the Diabetes Working Group (DWG) was formed in 2009 to focus on one crucial aspect of this problem – provider and delivery system barriers to diabetes treatment. The DWG’s focus on provider barriers addresses a gap in the current research on improving diabetes care. There are many organizations and initiatives focused on patient, structural, and technological barriers, and these efforts are of the highest importance. However, efforts surrounding provider barriers are limited, and unless this barrier is addressed along with the others, it will be impossible to achieve the objectives of improving patient care and outcomes.

The DWG is committed to improving care and outcomes for people with diabetes in the U.S. The following experts contributed to this paper as part of the DWG: Dr. Stuart Brink representing the American Academy of Pediatrics; Dr. Dan Einhorn, Dr. Etie Moghissi, and Dr. Farhad Zangeneh representing the American Association of Clinical Endocrinologists; Dr. Karen Fitzner, representing the American Association of Diabetes Educators; Dr. Richard Bergenstal representing the American Diabetes Association; Kelly Close representing diaTribe; Dr. Robert Vigersky representing the Endocrine Society; Dr. Aaron Kowalski representing the Juvenile Diabetes Research Foundation; Dr. Lynne Levitsky representing the Pediatric Endocrine Society; Dr. Bruce Bode, Dr. Irl Hirsch, and Dr. William Tamborlane. In addition, Avalere Health assisted the DWG with coordination, research, and writing efforts.

Prior research suggests a range of possible provider-related obstacles, including an inadequate supply of diabetes care specialists (including physicians, diabetes educators, nutritionists, and others),^{13,14,15} a payment system that rewards procedural over cognitive services,¹⁶ lack of care coordination,¹⁷ and inadequate provider education/training on intensive diabetes management.¹⁸ However, this existing research fails to fully document the issues in a compelling manner for policymakers, payers, and other stakeholders.

Through new research sponsored by the DWG, this white paper examines provider barriers to offering the current standards of diabetes care, and more importantly, offers recommendations to mitigate these barriers. To better understand these issues, primary and secondary research was conducted through a comprehensive literature review, an extensive survey of diabetes care providers, and development of a standards of care economic model.

- The comprehensive literature review includes peer-reviewed articles on current standards of diabetes care; evidence of improved outcomes for patients who achieve treatment targets; programs, practices, and modes of care that have successfully or unsuccessfully delivered optimal diabetes care; and current health economics of diabetes care and treatment. Results of the literature review served as a foundation for the DWG’s subsequent research for this white paper.
- The provider survey was fielded to a large sample of integral diabetes care providers in the United States. The objective of the survey was to identify the critical barriers to providing optimal diabetes care facing diabetes providers practicing in “real world” settings.
- The Standards of Care Delivery Model is a theoretical model to estimate the necessary resources to consistently deliver the current standards of care to diabetes patients in the United States. The model illustrates the gap between the current provision of care and what is needed to improve patient outcomes to meet current guidelines.

In this white paper, the results of these efforts are compared and evaluated, focusing on obstacles that prevent optimal patient outcomes. Most importantly, the data provide the framework for potential solutions that can help providers more consistently meet the standards of care and thus achieve the ultimate objective— helping more patients with diabetes achieve optimal outcomes.

Provider Survey

The objective of the provider survey was to measure how diabetes providers use and meet established standards of diabetes care and identify any barriers to meeting those standards when treating patients with diabetes. The survey was also designed to clarify any trends among the barriers across certain provider characteristics, such as provider type and practice size.

Methodology

The provider survey was a qualitative internet-based survey, which yielded complete responses from 1,056 diabetes care providers (survey questions found in Appendix A). The survey included responses from an additional 211 participants who answered one or more questions but did not complete the entire survey. Partial responses were analyzed and included in survey results. Participants who indicated that they do not currently treat patients with diabetes were terminated from the survey and were excluded from the analysis. Survey software provided by SurveyGizmo 3.0 was used to disseminate the survey. Due to survey distribution to multiple diabetes-focused organizations with overlapping membership, the total number of surveys sent out and thus the total response rate are unknown.

Five diabetes-focused organizations, including the American Diabetes Association, the Pediatric Endocrine Society, the American Academy of Pediatrics, the Endocrine Society, and the American Association of Clinical Endocrinologists, distributed the survey via email to their membership. In addition, the American Association of Diabetes Educators posted a link to the survey on its website. The members of each organization had one to three months to complete the survey, depending upon when each organization notified its membership. One additional email reminder notice was sent to members in each of the five organizations that communicated directly with their members. The survey closed on Sunday August 15, 2010. Since many providers of diabetes care belong to multiple organizations, the survey was set with a browser cookie to prevent duplicate responses. However, since some user computers do not accept or automatically delete cookies, the survey also contained an opening question meant to prevent duplication by terminating the survey if the participant answered that he/she had already taken the survey.

Of the possible 28 survey questions, eight allowed participants to select the response of “other” and to specify an alternative answer. Upon completion of the survey, questions with an “other” response were reviewed to identify if any of the write-in choices fell into one of the static response options. In addition, three questions requested participants enter a value. For each of these three questions, ranges were created and each response was then placed into one of the ranges to allow for data analysis. When participants chose to enter a range as their response value rather than a single number, the most conservative approach was taken when determining into which range the response would fall.

The provider survey results were also used to analyze the relationship between responses to multiple questions by using contingency tables (cross tabulation). For example, using cross tabulation, the relationship between responses by physicians with those of non-physician

providers can be observed and reveal whether or not physicians identify different barriers than non-physicians.

Results and Discussion

Each survey was evaluated individually, providing characteristics about survey participants and information on the barriers they face when attempting to provide optimal diabetes care. This analysis also provided information on the amount of non face-to-face time spent with patients, how often providers train patients to test and monitor blood glucose levels, how often providers use the team approach, and information specific to pediatric diabetes care.

Most survey Participants Were Endocrinologists Seeing Both Patients with Type 1 and Patients with Type 2 Diabetes

Of the survey participants, 85 percent identified themselves as physician providers and 15 percent as non-physician providers. As shown in Figure 1, most of the physician participants identified endocrinology as their primary medical specialty, with 52.3 percent of physician responders identifying themselves as adult endocrinologists and 29.4 percent as pediatric endocrinologists. Less than five percent of provider respondents identified their primary medical specialty as internal medicine, pediatrics, or general/family medicine. Of the non-physician providers, most (36.4 percent) identified themselves as Certified Diabetes Educators (CDE) or Board Certified Advanced Diabetes Management (BC-ADM) specialists, but some also identified themselves as registered nurses, registered dietitians, physician assistants, advanced practice nurses, and pharmacists. On average, most of the participants reported that they see less than 25 patients with diabetes per week (54 percent) and treat both patients with type 1 and type 2 diabetes (78.9 percent) (Figures 2 and 3). Finally, most survey participants primarily treat adult patients with diabetes (60 percent), though 29.1 percent report that they primarily treat pediatric patients, and 10.9 percent report treating both adult and pediatric patients with diabetes (Figure 4).

Figure 1: Primary Medical Specialty

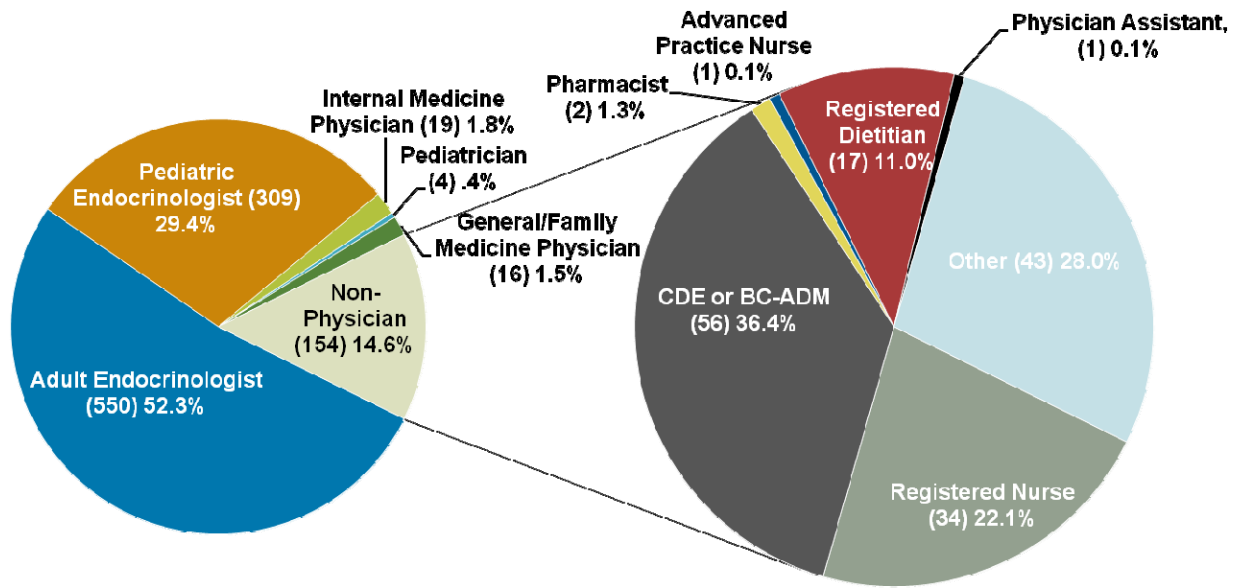


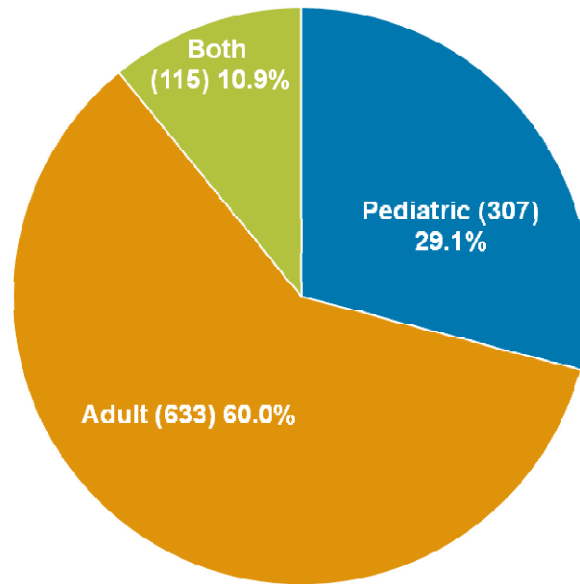
Figure 2: Type of Patient

Type of Patient	Percent
Both Patients with Type 1 and Patients with Type 2 Diabetes	78.9% (868)
Patients with Type 2 Diabetes	10.1% (111)
Patients with Type 1 Diabetes	9.7% (107)
Neither	1.3% (14)

Figure 3: Number of Patients Seen Per Week

Patients	Percent
0 – 25	54.0% (592)
26 – 50	28.5% (313)
51 – 75	8.9% (98)
76 – 100	6.0% (66)
101 – 125	1.5% (16)
126 – 150	0.5% (6)
> 150	0.5% (6)

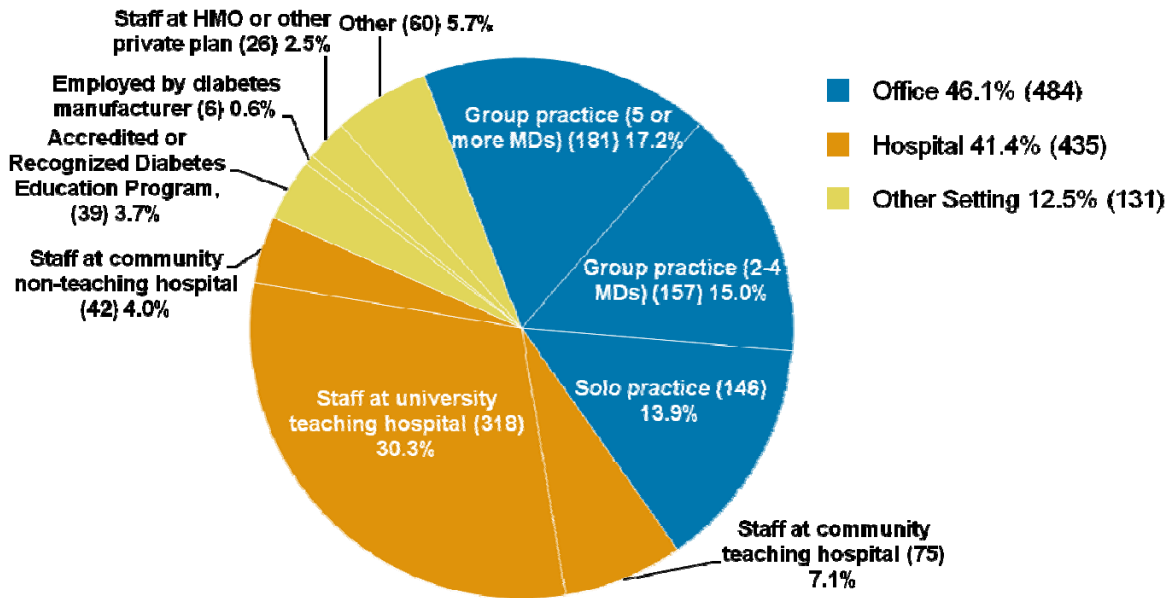
Figure 4: Patient Age Range



As shown in Figures 5 and 6, most survey participants described their practice or employment arrangements as a group or solo practice office (46.1 percent) or a hospital setting (41.4 percent). The remaining 12.5 percent reported working as staff at a health maintenance organization (HMO) or other private plan, being employed by a diabetes manufacturer, working at an accredited or recognized diabetes education program, or working as staff at a community non-teaching hospital. Similarly, most survey participants reported their primary practice setting as either a private clinic or office (44.3 percent) or as a hospital outpatient or inpatient setting (43.7 percent). The remaining 12 percent of responders selected other settings such as a community setting, an Indian health services clinic, a public health clinic or federally qualified health center, or a military or veterans affairs (VA) health system or clinic.

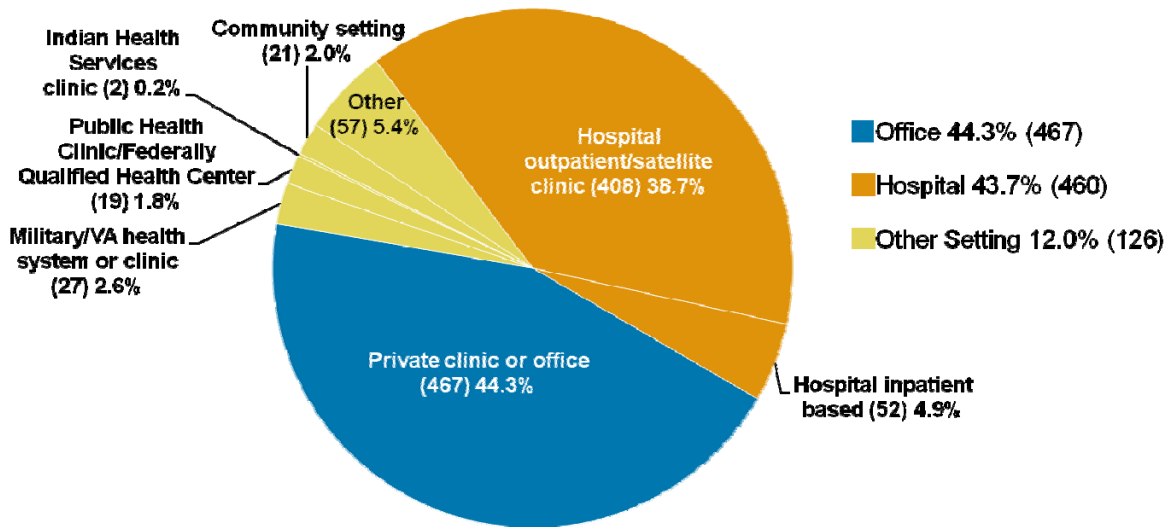
In addition, most participants indicated they worked in a team of providers, with 70.1 percent indicating they have a team within their practice and only 23.4 percent indicating they referred patients out to a team of external experts. Over 85 percent of providers working in diabetes care teams have a diabetes educator and a registered dietitian as part of their team, and over 85 percent of providers who referred patients to other specialists referred to an eye doctor.

Figure 5: Employment Setting



Note: Only providers who provide diabetes patient care were included in the survey. Providers indicating that their primary employment setting was a non-clinical setting, such as working for a diabetes manufacturer, also had to see patients in order to be included in the survey.

Figure 6: Primary Practice Setting

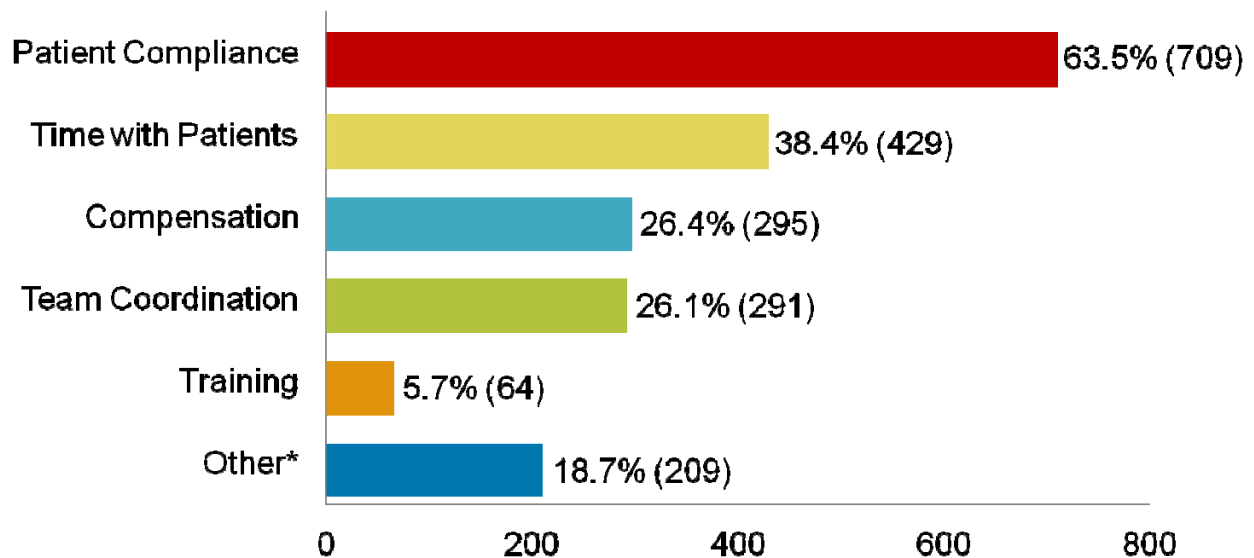


Patient Adherence and Time with Patients Were Identified by Most as Top Barriers to Providing Optimal Care

The survey was designed to assess barriers providers face when offering optimal diabetes care. The provider survey evaluated barriers to providing optimal diabetes care by first determining if providers followed the standards of care. Both the ADA and AACE have provided industry-respected and tested guidelines to assist providers. These guidelines represent the current standards of care, and providers following these guidelines are considered to be providing optimal diabetes care. However, the survey demonstrated providers found barriers preventing them from always meeting the standards. In fact, while most survey participants (92.0 percent) use the ADA or AACE guidelines when treating patients with diabetes, only 22.4 percent who use the guidelines report always meeting them.

The DWG identified five commonly reported barriers to providing optimal care to diabetes patients, including: patient adherence, time with patients, compensation, team coordination, and training. After survey participants selected the barriers they face while providing care, patient adherence was the top reported barrier, followed by time with patient, compensation, and team coordination (Figure 7). A significant portion of the respondents (18.2 percent) elected to write in additional barriers they face.

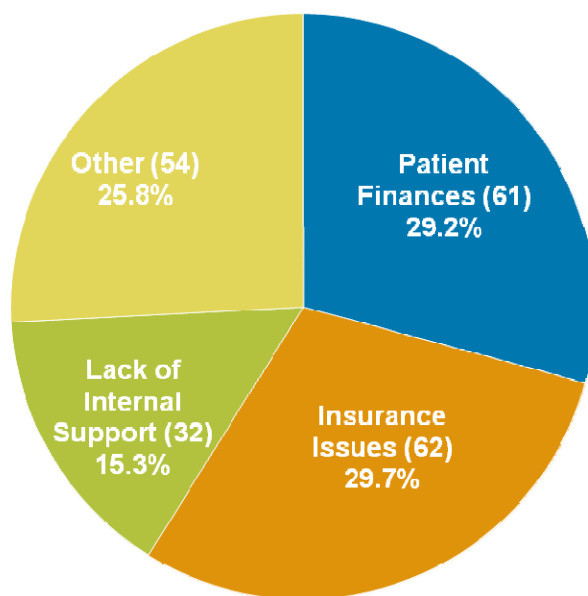
Figure 7: Barriers to Consistently Meeting Diabetes Standards of Care



*A break out of the “Other” write-in responses is provided in Figure 8.

Many of the write-in barriers were similar, with nearly 75 percent of them sorted into three explicit categories: patient finances, lack of internal support, and insurance issues (Figure 8).

Figure 8: “Other” Barriers to Consistently Meeting Diabetes Standards of Care



In addition to identifying barriers, survey participants ranked the barriers they selected, including write-in responses, and most providers ranked patient adherence as the number one barrier to providing optimal care to patients with diabetes. In Figure 9 below, the number of survey respondents that selected each barrier as first, second, third, fourth, or fifth is shown in each cell.

Figure 9: Ranking of Barriers to Meeting Standards

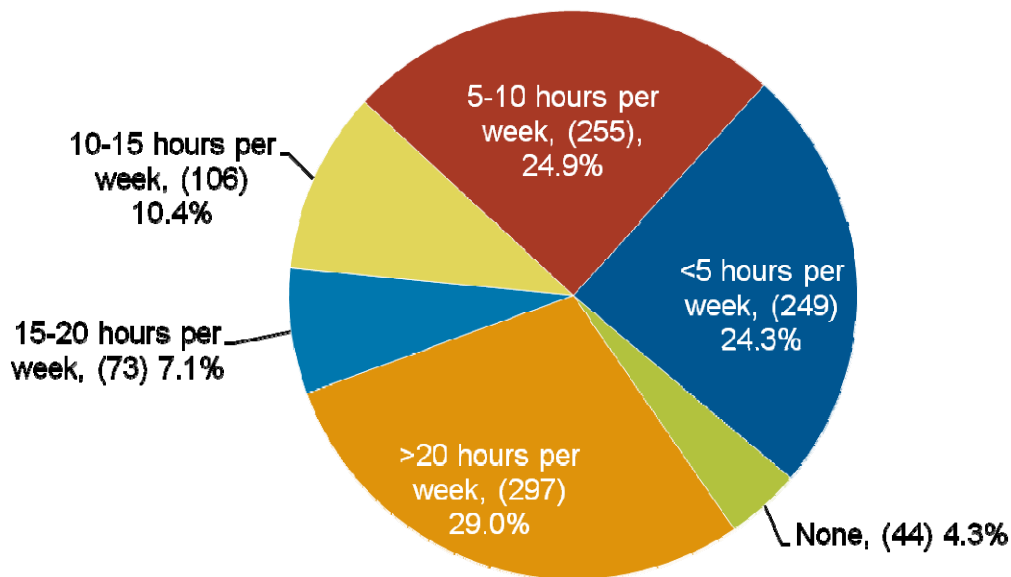
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Time with Patient	72	186	113	38	8
Compensation for Care	64	88	76	35	11
Team Coordination	40	81	75	50	17
Training	5	17	17	11	2

The cross tabulation of the barriers to meeting diabetes standards of care with a full range of patient and provider characteristics demonstrated that patient adherence, time with patients, and compensation for care remained the most frequently noted, and highest ranked, barriers to meeting diabetes standards of care. This was regardless of the type of provider, the type or age of patients treated, the provider’s medical specialty, and practice setting.

Most Diabetes Providers Provide Between Visit Care

The provider survey also revealed information about the amount of time providers spend training patients and providing care between visits. Virtually all survey respondents indicated they train appropriate patients to self-monitor blood glucose levels (96.1 percent) and to use blood glucose data to adjust their own therapy (94.8 percent). In addition, the vast majority of survey respondents (95.7 percent) provide any care between visits. However, as shown in Figure 10, participants who reported spending time on between-visit care varied in their responses regarding the amount of time spent each week. This variation was not correlated with practice size, practice setting, or the type or age of diabetes patients being treated. Finally, Endocrinologists and CDEs or BC-ADMs were reported as providing care between visits most often, but many other specialties were also identified as providing between-visit care.

Figure 10: Time Spent Providing Between Visit Care



Most Providers Treating Pediatric Patients Note Difficulty Transitioning Patients to Adult Diabetes Care

Of the responders to the survey, 40 percent indicated they treat only pediatric patients or both pediatric and adult patients with diabetes, and answered survey questions about barriers providers face specific to pediatric care. For example, providers of care to pediatric patients with diabetes may need to educate school personnel, spend more time with a new patient, and face issues with transitioning patients to adult diabetes care.

As shown in Figure 11, over 78% of pediatric provider reported spending time educating non-parent providers (e.g., school staff) on diabetes care. Most of the pediatric providers spent less than five hours each week (51.7 percent) educating non-parent providers. In addition, slightly more than half of participants who treated pediatric patients (51.0 percent) spent more than an

hour per week with new pediatric patients. Similarly, about half (49.8 percent) reported spending more than an hour with a pediatric patient starting on an insulin pump. It is possible that these numbers reflect the fact that certain provider types not surveyed (e.g., medical assistants, nurses who are not diabetes educators, etc.) may be providing the bulk of new patient and insulin pump training.

Roughly half of providers treating pediatric patients indicated they work with support groups (Figure 12). Finally, most providers treating pediatric patients (79.6 percent) responded that they have difficulty with pediatric patients transitioning to adult diabetes care (Figure 13).

Figure 11: Time Spent Educating Non-Parent Providers

Hours Per Week	Percent
< 5 hours	51.6% (208)
5 – 10	15.1% (61)
10 – 15	3.5% (14)
15 – 20	1% (4)
> 20	1.5% (6)
None	27.3% (110)
Total	100% (403)

Figure 12: Providers Indicate They Work with Support Groups

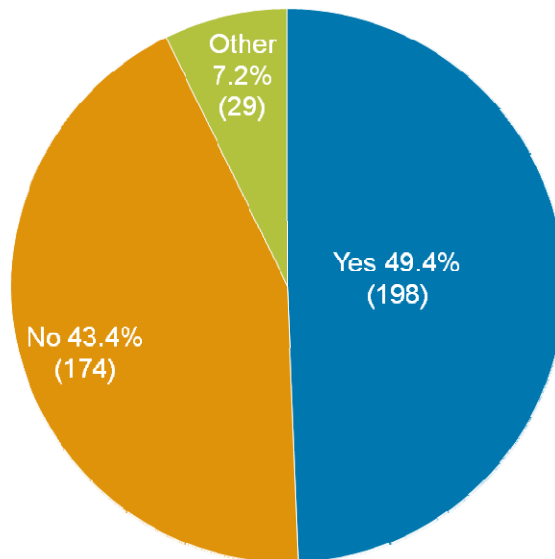
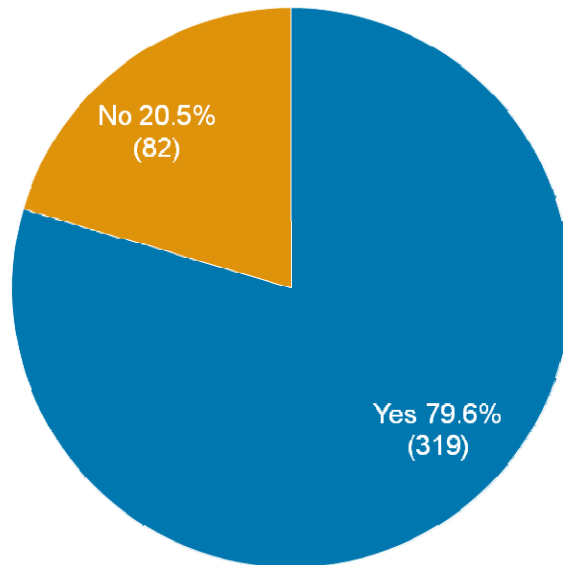


Figure 13: Difficulty with Pediatric Patients Transitioning to Adult Diabetes Care



Cross tabulation of pediatric provider and patient characteristics with responses to the amount of time spent educating, prevalence of working with support groups, and difficulty with pediatric patient transition to adult care revealed consistent findings. Responses were generally the same regardless of the type of provider, the type of patients treated, the provider’s medical specialty, and practice management.

Conclusions

Stakeholders in the diabetes community recognize the importance of standards-based diabetes care, yet also note that most patients with diabetes are not receiving such care. In fact, many continue to highlight obstacles to achieving optimal diabetes care, and providers face many of these barriers on a daily basis. The results of this extensive provider survey illustrate five provider-specific barriers – patient adherence, time with patients, compensation for care, team coordination, and care management – most critical to their ability to provide patients with diabetes the care and treatment required to meet current standards.

Patient adherence and time with patients were highlighted by survey responders as two of the most prevalent barriers faced when providing standards-based care. These barriers are interrelated in that patients’ ability to meet their treatment goals and adhere to their prescribed plan of care can be directly affected by the amount of guidance and education received from their health care team, which requires time. While little research exists examining the relationship between the time a patient spends with providers and their adherence or outcomes^{19,20}, the oft noted effect of participating in clinical trials – that extra attention participants receive increases adherence and thus improves outcomes - serves as a powerful proxy. The additional time and attention patients receive from providers when enrolled in a

clinical trial boosts their adherence and outcomes.²¹ This suggests that if providers in “real world” practice could spend more time with their diabetes patients to help them build the skills they need to manage their disease, outcomes may be improved accordingly.

The survey results suggest that the current system of diabetes care fails to yield providers the time required to achieve standards-based care and treatment. The persistence of these barriers, coupled with the growth in prevalence of diabetes, make resolving these barriers to provider care imperative. In the remainder of this paper we explore the economic issues that may affect providers' ability to provide optimal diabetes care and offer a series of recommendations to overcome the provider barriers identified and better enable diabetes providers to help their patients achieve optimal outcomes.

Standards of Care Economic Model

Methodology

The objective of the Standards of Care Economic Model was twofold: 1) to build a theoretical model to estimate the resources necessary for providers to consistently deliver the current standards of care to diabetes patients in the United States and 2) to evaluate provider costs to meet the standards and patient outcomes specified in diabetes care guidelines relative to current reimbursement for these services.

To establish the current standards, three sets of multi-part national standards for diabetes care were combined and the duplicates removed to produce the consolidated set of 26 standards of optimal care in this analysis. Three additional activities were identified that are not standards *per se*, but which are required in order to achieve the care standards, for a total of 29 activities.

Consolidated Standards of Optimal Diabetes Care^{22,23,24}

History and Physical: 1. Scope as appropriate*
Monitoring: 2. Counsel on self-monitoring of blood glucose (SMBG); monitor and discuss maintenance of optimal level of hemoglobin A1c 3. Counsel on continuous glucose monitoring (CGM) 4. Medication education/monitoring (side effects, etc.) 5. Monitor hypoglycemia/prescribe (glucagon) as necessary 6. Monitor/evaluate risk of coronary heart disease (including performance of annual lipid profile and discussion) 7. Perform annual test to assess urine albumin (urine dipstick quarterly) 8. Measure serum creatinine at least annually; also monitor for celiac disease and autoimmune thyroid disease
Systemic Monitoring: 9. Measure blood pressure at every routine diabetes visit 10. Manage hypertensive conditions as appropriate 11. Screen for celiac disease 12. Screen for autoimmune thyroid disease 13. Monitor risk/progress of retinopathy 14. Monitor risk/progress of nephropathy 15. Screen for distal symmetric polyneuropathy (DPN) at diagnosis and at least annually thereafter 16. Perform annual comprehensive foot examination to identify risk factors predictive of ulcers and amputations; counsel on self-foot care 17. Perform screening for peripheral artery disease (PAD)

<p>Prevention (General Health):</p> <p>18. Provide annual influenza vaccination</p> <p>19. Provide pneumococcal polysaccharide vaccine to all diabetic patients >2 years of age</p>
<p>Gender-Specific Issues:</p> <p>20. Address gender-specific issues (family planning, menopause, menstruation, etc.)*</p>
<p>Lifestyle:</p> <p>21. Provide/refer for individualized medical nutrition therapy (MNT) and counsel on dietary habits (saturated fat intake <7% of total calories; carbohydrate monitoring, sugar alcohols and non-nutritive sweeteners; routine supplementation)</p> <p>22. Counsel on regular physical activity, including resistance training (150 min/week) and on weight (maintenance, loss, etc.)</p> <p>23. Counsel on smoking cessation (if applicable)</p>
<p>Morphology Interventions: (as appropriate to 6% of population)</p> <p>24. Counsel on appropriateness of bariatric surgery (for adults with BMI > 35 kg/m²)</p> <p>25. Provide ongoing lifestyle support for patients having undergone bariatric surgery</p>
<p>Treatment Training:</p> <p>26. Provide/refer for diabetes self-management training (DSMT); including lifestyle management training, blood chemistry monitoring training, blood chemistry management training</p>
<p>Psychosocial Services:</p> <p>27. Assess psychological and social situation on an ongoing basis</p> <p>28. Screen for psychosocial problems such as depression and diabetes related distress, anxiety, eating disorders, and cognitive impairment</p>
<p>Documentation/Treatment Planning/Referrals:</p> <p>29. Documentation of visit, development of treatment planning, referral coordination, etc.*</p>

*Not a standard *per se*, but category added to capture all time involved in completing all standards for a total of 29

To the fullest extent possible, the activity needed to achieve the care standards was described using the Current Procedural Terminology (CPT) and Healthcare Common Procedure Coding System (HCPCS) codes that would typically be used by providers to bill for these services. A list of the codes included in the model is provided in the table below.

CPT or HCPCS Codes and Descriptions of Services Needed to Achieve Optimal Standards of Care (Reimbursement Perspective)^{25,26}

<p>Office visits:</p> <p>99203 Office or other outpatient visit for the evaluation and management of a new patient, which requires these 3 key components: A detailed history; A detailed examination; Medical decision making of low complexity. Counseling and/or coordination of care with other providers or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate severity. Physicians typically spend 30 minutes face-to-face with the patient and/or family</p>

Office visits (continued):

99204 Office or other outpatient visit for the evaluation and management of a new patient, which requires these 3 key components: A comprehensive history; A comprehensive examination; Medical decision making of moderate complexity. Counseling and/or coordination of care with other providers or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate to high severity. Physicians typically spend 45 minutes face-to-face with the patient and/or family

99205 Office or other outpatient visit for the evaluation and management of a new patient, which requires these 3 key components: A comprehensive history; A comprehensive examination; Medical decision making of high complexity. Counseling and/or coordination of care with other providers or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate to high severity. Physicians typically spend 60 minutes face-to-face with the patient and/or family

99213 Office or other outpatient visit for the evaluation and management of an established patient, which requires at least 2 of these 3 key components: An expanded problem focused history; An expanded problem focused examination; Medical decision making of low complexity. Counseling and coordination of care with other providers or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of low to moderate severity. Physicians typically spend 15 minutes face-to-face with the patient and/or family

99214 Office or other outpatient visit for the evaluation and management of an established patient, which requires at least 2 of these 3 key components: A detailed history; A detailed examination; Medical decision making of moderate complexity. Counseling and/or coordination of care with other providers or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate to high severity. Physicians typically spend 25 minutes face-to-face with the patient and/or family

99215 Office or other outpatient visit for the evaluation and management of an established patient, which requires at least 2 of these 3 key components: A comprehensive history; A comprehensive examination; Medical decision making of high complexity. Counseling and/or coordination of care with other providers or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate to high severity. Physicians typically spend 40 minutes face-to-face with the patient and/or family

Cardiovascular diagnostic services:

93000 Electrocardiogram, routine ECG with at least 12 leads; with interpretation and report

Ophthalmology services:

92002 Ophthalmological services: medical examination and evaluation with initiation of diagnostic and treatment program; intermediate, new patient

92004 Ophthalmological services: medical examination and evaluation with initiation of diagnostic and treatment program; comprehensive, new patient, 1 or more visits

92012 Ophthalmological services: medical examination and evaluation, with initiation or continuation of diagnostic and treatment program; intermediate, established patient

92014 Ophthalmological services: medical examination and evaluation, with initiation or continuation of diagnostic and treatment program; comprehensive, established patient, 1 or more visits

Psychiatric, Psychology, and Counseling services:

90801 Psychiatric diagnostic interview examination

90810 Individual psychotherapy, interactive, using play equipment, physical devices, language interpreter, or other mechanisms of non-verbal communication, in an office or outpatient facility, approximately 20 to 30 minutes face-to-face with the patient

<p>Neuropathy diagnostic services:</p> <p>G0247 Routine foot care by a physician of a diabetic patient with diabetic sensory neuropathy resulting in a loss of protective sensation (LOPS) to include, the local care of superficial wounds (i.e. superficial to muscle and fascia) and at least the following if present: (1) local care of superficial wounds, (2) debridement of corns and calluses, and (3) trimming and debridement of nails</p>
<p>Medical nutrition and diabetes management training:</p> <p>97802 Medical nutrition therapy; initial assessment and intervention, individual, face-to-face with the patient, each 15 minutes</p> <p>97803 Medical nutrition therapy; re-assessment and intervention, individual, face-to-face with the patient, each 15 minutes</p> <p>97804 Medical nutrition therapy; group (2 or more individual(s)), each 30 minutes</p> <p>G0108 Diabetes outpatient self-management training services, individual, per 30 minutes</p> <p>G0109 Diabetes outpatient self-management training services, group session (2 or more), per 30 minutes</p>
<p>Laboratory tests:</p> <p>83036 Hemoglobin; glycosylated (A1C)</p> <p>80061 Lipid panel</p> <p>82043 Albumin; urine, microalbumin, quantitative</p> <p>82565 Creatinine; blood</p> <p>82784 Gammaglobulin (immunoglobulin); IgA, IgD, IgG, IgM, each</p> <p>86376 Microsomal antibodies (eg, thyroid), each</p>
<p>Smoking cessation services:</p> <p>99406 Smoking and tobacco use cessation counseling visit; intermediate, greater than 3 minutes up to 10 minutes</p> <p>99407 Smoking and tobacco use cessation counseling visit; intensive, greater than 10 minutes</p>
<p>Continuous glucose monitoring:</p> <p>95250 Ambulatory continuous glucose monitoring of interstitial tissue fluid via a subcutaneous sensor for a minimum of 72 hours; sensor placement, hook-up, calibration of monitor, patient training, removal of sensor, and printout of recording</p> <p>95251 Ambulatory continuous glucose monitoring of interstitial tissue fluid via a subcutaneous sensor for a minimum of 72 hours; interpretation and report</p>

Because the model focuses on provider services, any medications and medical equipment purchased by the patient were not included in the analysis.

A matrix of health professionals rendering the care needed to achieve the standards was developed, including physicians (adult and pediatric, general and specialty care), certified diabetes educators, registered dietitians, registered nurses, physician assistants, medical assistants, eye care professionals, mental health professionals, podiatrists, clinical laboratory personnel, and smoking cessation professionals. We also included physical trainers, who would provide services to support the standards related to exercise, although we did not include the cost of physical trainers in our baseline model results.

Several panels of three to ten diabetes care professionals (Appendix B) were convened to estimate the time (in minutes) needed by a professional in each of the job categories to provide care in a way that would result in achievement of each care standard. Panel experts were asked to estimate time for an initial encounter with the patient and for subsequent encounters made throughout a single year in a patient’s life to meet the standards. The panels were asked to estimate the number of visits per year the patient would make and the time the professional would spend at each visit. The number of times patients visited professionals in the course of a year was determined by the standards of care (where standards specified a frequency). The panels were asked to indicate the ideal number of visits required to meet the standards of care in cases where frequency is not specified in the care standards.

The time estimation exercise was repeated six times to account for variations in care needed by different types of patients – three patients with type 2 diabetes and three with type 1 diabetes - likely to be seen in the course of practice. The characteristics of the different patient types can be seen below.

Characteristics of Patient Types in Clinical Vignettes Analyzed

Type 2 Diabetes Patient Vignettes			
	Adult (age 40)	Adult (age 50)	Adult (age 67)
Weight	80 kg	100 kg	80 kg
Duration of Diabetes	1 year	5 years	15 years
Comorbidities	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • CAD • Metabolic syndrome (overweight, hypertension, hyperlipidemia) 	<ul style="list-style-type: none"> • CAD • Hypertension • Hyperlipidemia
Diabetes Medications	<ul style="list-style-type: none"> • Metformin 	<ul style="list-style-type: none"> • Metformin • TZD 	<ul style="list-style-type: none"> • Metformin
Other Medications	<ul style="list-style-type: none"> • Anti-hypertensive • Statin • Anti-coagulant 	<ul style="list-style-type: none"> • Anti-hypertensives(2) • Statin • Anti-coagulant 	<ul style="list-style-type: none"> • Anti-hypertensives(2) • Statin • Anti-coagulant

Type 1 Diabetes Patient Vignettes			
	Child (age 10)	Adolescent (age 16)	Adult (age 67)
Weight	25 kg	60 kg	60 kg
Duration of Diabetes	1 year	6 years	40 years
Comorbidities	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Psychosocial issues– rebelling against treatment 	<ul style="list-style-type: none"> • CAD • Hypertension • Hyperlipidemia • Retinopathy
Diabetes Medications	<ul style="list-style-type: none"> • Multiple daily injections 	<ul style="list-style-type: none"> • Multiple daily injections – switching to CSII 	<ul style="list-style-type: none"> • Multiple daily injections
Other Medications	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Anti-hypertensive • Statin • Anti-coagulant • Angina medication

A separate expert panel was convened to repeat the time estimation exercise, isolating the additional (i.e., beyond what had already been measured at baseline) time needed to start or continue to follow throughout one year patients using a continuous glucose monitoring system (CGM) or continuous subcutaneous insulin infusion (CSII). Because not all panel members had direct experience with CGM and CSII, we collected additional data from experts in these technologies via an email data collection instrument. The additional provider activities associated with this care can be seen in the table below.

Additional Provider Activities Associated with CGM and CSII

CGM:
<ol style="list-style-type: none"> 1. Insurance Authorization, paperwork, etc. 2. Patient training - device, insertion, calibration, etc. (includes all training time, including follow-up questions via phone/email, etc.) 3. Patient training - data download, review, treatment adjustments (includes all training time, including follow-up questions via phone/email, etc.) 4. Review of data (includes non face-to-face data download) 5. Discuss data results with patient, initiate any treatment changes 6. Documentation, treatment planning, referral coordination, etc.
CSII:
<ol style="list-style-type: none"> 1. Insurance Authorization, paperwork, etc. 2. Training on insulin pump (device-related): insertion, maintenance, how to use, etc. (includes follow-up questions, etc.) 3. Training on carb counting, bolusing, etc. 4. Initiate device - set initial basal rates, bolus formulas, etc. 5. Data review, adjustments, etc. - 1st week (patient at home or in clinic) 6. Ongoing data review, adjustments to basal rates, bolus formulas, etc. (includes non face-to-face time; e.g., phone calls, email/fax review, etc.) 7. Documentation, treatment planning, referral coordination, etc.

Panel meetings were conducted by a facilitator, who gained the consensus of the group when differing estimates were offered for single activities. The facilitator summed the minutes and gained the consensus of the panels on total time expended to assure that the panel had not over-estimated total time as a result of focusing on the completion of individual activities.

Because the time required to meet the standards can vary for a variety of reasons even for similar types of patients, panelists were asked to provide a base case and best case time estimate for each activity, defined as follows:

- Base case: Amount of time required assuming a mix of patient complications, non-optimal patient/caretaker adherence, and possible administrative delays (e.g., delays in scheduling, paperwork, etc.).
- Best case: Amount of time required to provide standards-based care assuming optimal patient/caretaker adherence, no patient complications, and no administrative delays.

For the CGM and CSII time data, this process was followed using telephone and email communication.

The two primary components of the model are provider costs and provider reimbursement. The difference between provider costs and reimbursement was calculated to determine the reimbursement gap for providing standards-based diabetes care. Methods for calculating each of these components are as follows.

Provider Costs

To determine the cost to professionals of providing treatment that meets the standards of care, total minutes (best case and base case) incurred by each professional was multiplied by an hourly wage to derive a direct cost for professional time. Indirect (i.e., other) practice costs, computed as a percentage of direct professional time cost, were added to direct costs so as to arrive at total practice cost expenditures for all professionals. Salary and indirect (overhead) rates were based on data from nationally representative sources.^{27,28} If salary or overhead rates for a specific job category were not available from nationally representative sources, extrapolation of salaries and overhead rates was made from those for like occupations.

The formula for these calculations is as follows:

$$\text{Provider Cost}_{\text{basecase}} = \text{Time}_{\text{basecase_hours}} * \text{Hourly Salary}_{\text{provider type}} * \text{Overhead Rate}_{\text{provider type}}$$

$\text{Time}_{\text{basecase_hours}}$ represents the base case time estimates provided by the panel, and $\text{Hourly Salary}_{\text{provider type}}$ and $\text{Overhead Rates}_{\text{provider type}}$ represent the average hourly salary and overhead rates for each type of provider. This formula was applied to the best case time estimates provided by the panels as follows:

$$\text{Provider Cost}_{\text{bestcase}} = \text{Time}_{\text{bestcase_hours}} * \text{Hourly Salary}_{\text{provider type}} * \text{Overhead Rate}_{\text{provider type}}$$

The formulas were repeated for each provider type involved in each activity. Provider costs were summed to calculate a total cost per activity, and activity costs were summed to calculate the per visit provider costs. Per visit costs were summed across all visits to derive the Provider Cost per patient, per year. In each case, two costs were calculated, one reflecting the base case time estimates from the panels and the second reflecting the best case time estimates from the panels.

Provider Reimbursement

Provider reimbursement professionals mapped the expert panels' timing estimates into billing codes so as to compute the Medicare reimbursement that would be collected as a result of activity performance.²⁹ For example, if a provider spent 45 minutes with a patient, it was assumed that reimbursement was for a Level 5 office visit (i.e., CPT code 99205 for a new patient or CPT code 99215 for an established patient), each thirty minutes of diabetes educator time was mapped to HCPCS codes G0108 and G0109, and so on.

Because providers are not always reimbursed commensurate with the amount of time they spend with patients, conservative assumptions were used. For example, because claims for extended office visit codes (99354 and 99355) are frequently denied – 2009 Medicare claims show that 17% of endocrinologist claims for CPT code 99354 were denied and 34% of endocrinologist claims for 99355 were denied - the baseline model estimates assume that no reimbursement was made for extended office visits. In addition, we included level 5 office visit codes in our analysis consistent with the time reported by the provider panels. However, analysis of 2009 Medicare provider claims shows that endocrinologists typically bill levels 3 and 4 office visit codes (i.e., 99203 and 99204 for new patients and 99213 and 99214 for established patients), rather than level 5 office visit codes. Panel members acknowledged that they rarely bill for level 5 office visits even when justified because claims for these codes are often denied or audited.

Finally, it was assumed that the full amount of diabetes education and medical nutrition visit time was reimbursed, despite Medicare and other payers typically limiting the amount of education services covered. For example, Medicare limits coverage of diabetes self – management training (DSMT) to 10 hours during the first 12 months and 2 hours per year for subsequent training and of medical nutrition therapy (MNT) services to three hours the first year and two hours each year after that.

Therefore, the baseline estimates of reimbursement in the model are likely high compared to actual reimbursement. Sensitivity analyses were conducted to assess the implications of these and other critical model assumptions.

As appropriate, Medicare reimbursement rates were adjusted to reflect reimbursement profilesⁱ more closely approximating the average payer mix expected for a group of patients of the type being described in a particular scenario³⁰, e.g., a pediatric population having negligible Medicare coverage but instead a Medicaid, other state/federal program, and commercial insurance mix. Individual reimbursement amounts were summed to derive a total amount of reimbursement.

Reimbursement Gap

The total reimbursement amount was compared to the total provider cost figure and any differences noted as a “reimbursement gap”. Two reimbursement gap amounts were calculated, one using the base case Provider Cost estimate (reflecting the base case provider time estimates from the panels) and the second using the best case Provider Cost estimate (reflecting the best case time estimates from the panels). The formula used to calculate the reimbursement gaps is as follows:

$$\text{Reimbursement Gap}_{(\text{per patient, per year_base case})} = \text{Provider Cost}_{(\text{per patient, per year_base case})} - \text{Reimbursement}_{(\text{per patient, per year})}$$
$$\text{Reimbursement Gap}_{(\text{per patient, per year_best case})} = \text{Provider Cost}_{(\text{per patient, per year_best case})} - \text{Reimbursement}_{(\text{per patient, per year})}$$

Provider cost, reimbursement, and gap amounts were calculated on a per-patient, per-year basis.

Finally, an annual gap between provider cost and reimbursement for a typical adult and pediatric diabetes practice was calculated. The annual gap is calculated based on the number of diabetes patients seen per year. This estimate is based on the median number of diabetes patients seen per week for adult and pediatric practices (as reported in the Provider Survey section of this paper), multiplied by the average number of patients seen per year (based on national estimates from the Medical Group Management Association³¹). National statistics on diabetes prevalence by type of diabetes and age³² were used to assign gap amounts from the individual patient vignettes from the model to the annual diabetes patient population for an adult and pediatric practice. Gap amounts were included with and without provider costs and reimbursement for CSII and CGM. The gap amounts including CSII and CGM include assumptions about CSII and CGM use based on available data regarding type 1 and type 2 patient use of these technologies.ⁱⁱ

ⁱ Reimbursement from different payers assumed to be these percentages of Medicare rates: commercial insurance 120%; Medicaid 60%; self-pay 200%; no pay 0%.

ⁱⁱ It was assumed that 30% of US pediatric type 1 patients use CSII and 5% of pediatric type 1 patients use CGM and that 10% of older adult type 1 patients use CSII and 1% of these patients use CGM. The conservative assumption that there is no CSII or CGM use among Type 2 adult patients was applied. Sources include: Pickup JC, “Are Insulin Pumps Underutilized in Type 1 Diabetes? Yes,” *Point-Counterpoint, Diabetes Care* 29:6 (June 2006): 1449-1452) and Avalere Health analysis of 2010 and 2011 industry reports.

Results

As shown in Figures 14-19, provider costs exceed reimbursement for all of the patient vignettes when the base case provider time estimates are used. Baseline model results show a gap between provider costs and reimbursement of \$121 - \$829 per patient, per year, depending on characteristics of the patient. The gap is the largest for the adolescent patient with type 1 diabetes, and the gap is the lowest for the 40-year old patient with type 2 diabetes. Using the best case provider time estimates, baseline model results show that reimbursement exceeds provider costs for five of the six patient scenarios, by amounts ranging from \$28 to \$243 per patient, per year. Provider costs exceed reimbursement in the baseline model for the adolescent with type 1 diabetes even when the best case time estimates are applied.

Sensitivity analyses were performed by varying provider time, the level of office visit codes reimbursed, and amount of diabetes education and medical nutrition therapy reimbursed (Figures 14-19). The model is highly sensitive to assumptions about provider reimbursement, particularly assumptions regarding the level of office visit code reimbursed. For example, when it is assumed that reimbursement for office visits is capped at a level 3 office visit amount (i.e., CPT codes 99203 and 99213), the gap between provider cost and reimbursement is significantly larger than baseline, ranging from \$454 to \$1,097 per patient, per year using base case time estimates and \$18 to \$233 per patient, per year when using best case time estimates.

When assuming reimbursement for office visits is capped at the level 4 office visit amount (i.e., CPT codes 99204 and 99214), the gap between provider cost and reimbursement also is significantly larger than baseline, ranging from \$289 to \$961 per patient, per year using base case time estimates. Using best case time estimates, provider reimbursement exceeds costs for four of the six patient scenarios, ranging from \$28 - \$136 per patient, per year. Provider costs exceed reimbursement for two of the patient vignettes, even using the best case time estimates, by \$64 per patient, per year for the 67 year old patient with type 2 diabetes and \$103 per patient, per year for the adolescent patient with type 1 diabetes.

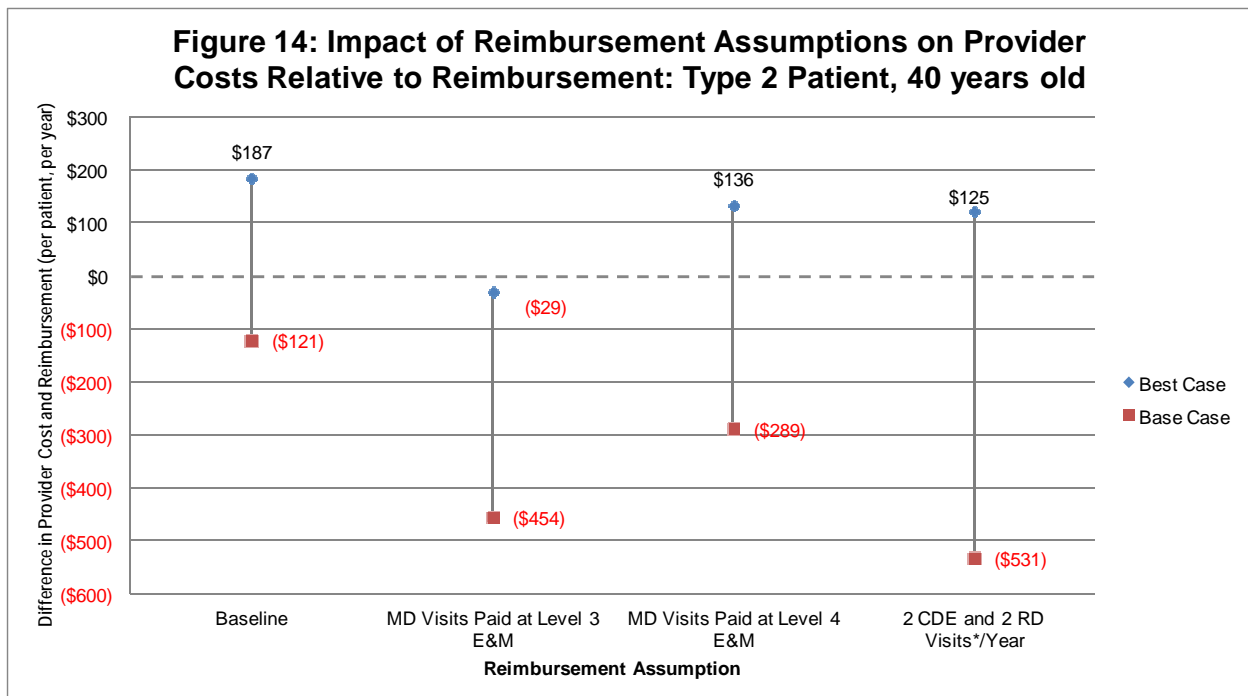
Payers often limit the amount of diabetes education and nutrition therapy allowed, and two of the type 1 patient vignettes (Figures 17 and 18) are sensitive to assumptions about the amount of diabetes education and nutrition therapy reimbursed. Assuming a maximum reimbursement of two hours each of diabetes education and medical nutrition therapy per year, the gap between provider costs and reimbursement using base case time estimates is \$829 and \$1,150 per patient, per year for the 10 year old type 1 patient and the 16 year old type 1 patient, respectively. Using best case time estimates, provider reimbursement exceeds costs by \$67 per patient, per year for the 10 year old type 1 patient, while provider costs exceed reimbursement by \$148 per patient, per year for the 16 year old type 1 patient.

Model results for provider activities related to CSII and CGM are shown in Figures 20-23. Provider costs exceed reimbursement for CSII and CGM services for both adult and pediatric patients when base case time estimates are used. The gap between provider costs and reimbursement for CSII services is \$103 per patient, per year for adult patients and \$1,573 per patient, per year for pediatric patients. The gap between provider costs and reimbursement for

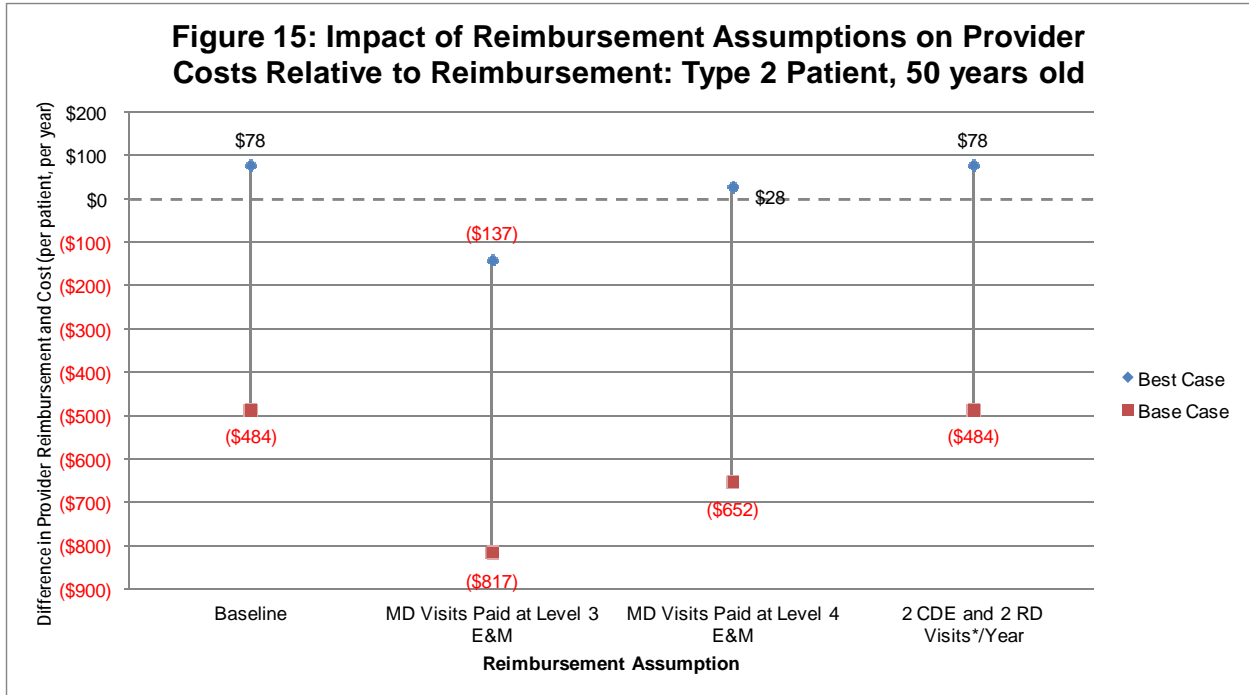
CGM services is \$662 per patient, per year for adult patients and \$1,506 per patient, per year for pediatric patients. Reimbursement exceeds provider costs for CGM and CSII for adult patients when best case time estimates are applied. For pediatric patients, the gap between provider costs and reimbursement is \$299 per patient, per year for CSII and \$375 per patient, per year for CGM using best case time estimates.

CSII model results were not sensitive to assumptions about provider reimbursement, while CGM model results were highly sensitive to assumptions about provider reimbursement for both CGM interpretation (CPT code 95251) and office visit codes and the frequency of reimbursement for CGM interpretation. For both adults and pediatric patients for both base case and best case time estimates, provider costs substantially exceed reimbursement when reimbursement is limited to a maximum of four, three, two, or one CGM interpretations per patient, per year with no reimbursement for office visit codes (Figures 22 and 23).

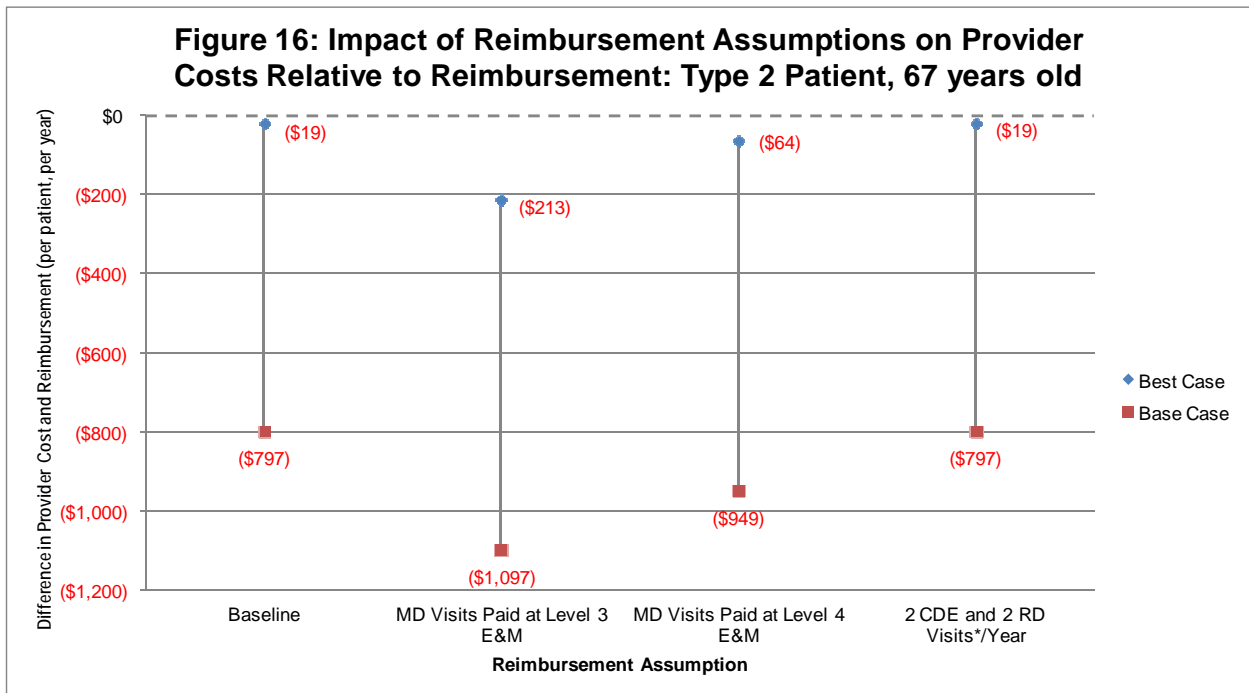
The annual gaps per year for providing standards-based diabetes care for an average pediatric and adult diabetes practice are shown in Exhibits 24 and 25. Using the base case time estimates, the annual gap per practice for an adult practice is \$754,623 excluding costs for CSII and CGM and \$755,053 including CGM and CSII costs. For a pediatric practice, the annual gap is \$471,098 excluding costs for CSII and CGM and \$856,875 when CSII and CGM costs are included.



*Assumes each visit is 60 minutes.

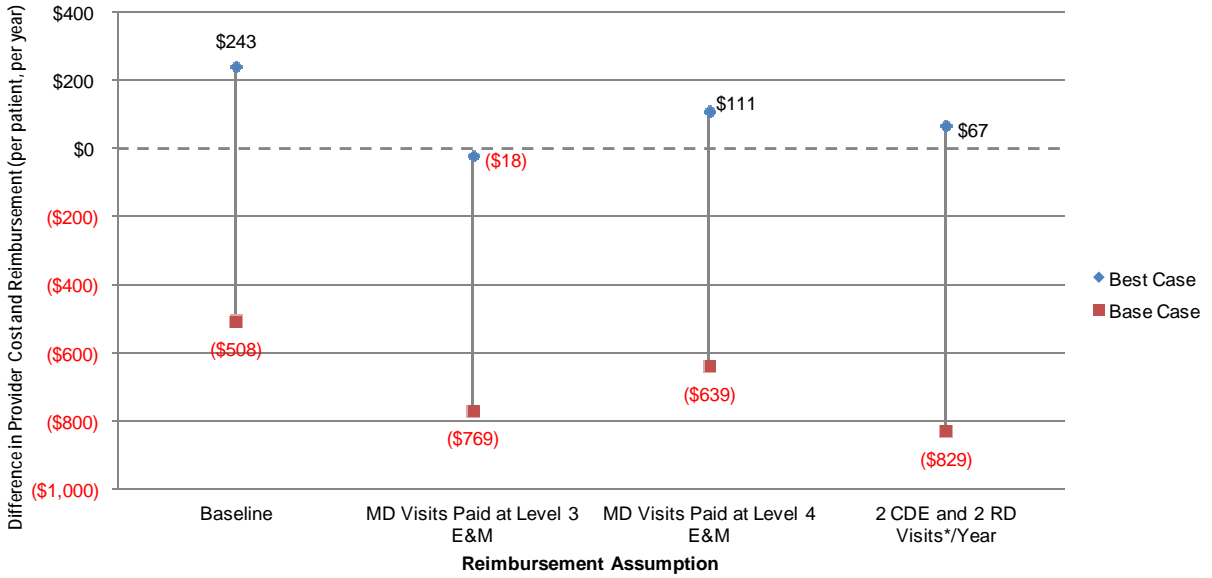


*Assumes each visit is 60 minutes.



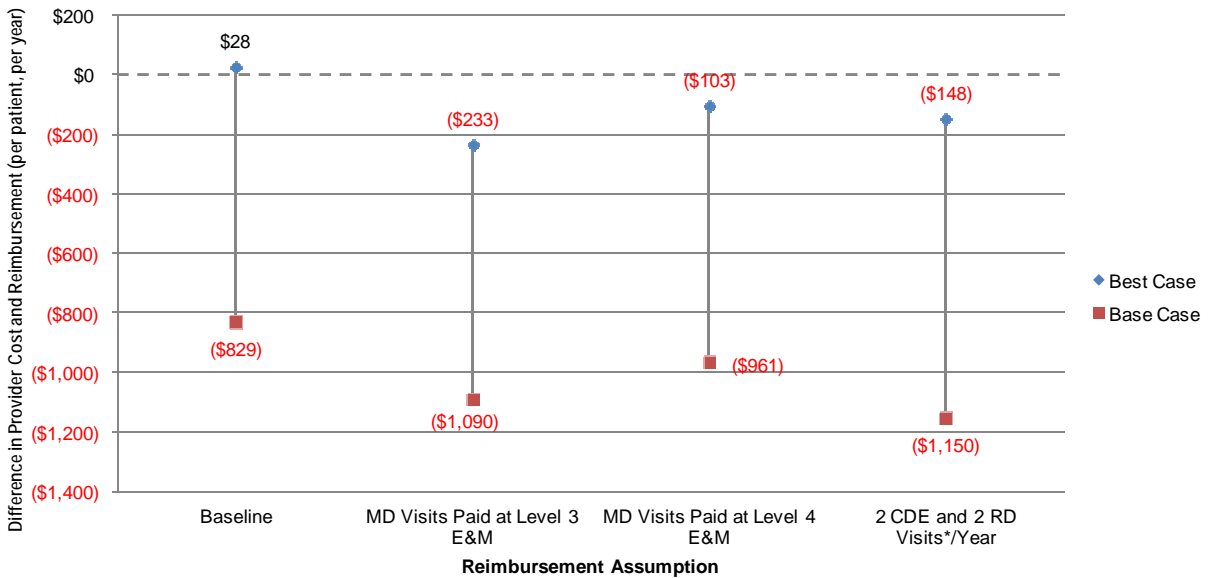
*Assumes each visit is 60 minutes.

Figure 17: Impact of Reimbursement Assumptions on Provider Costs Relative to Reimbursement: Type 1 Patient, 10 years old

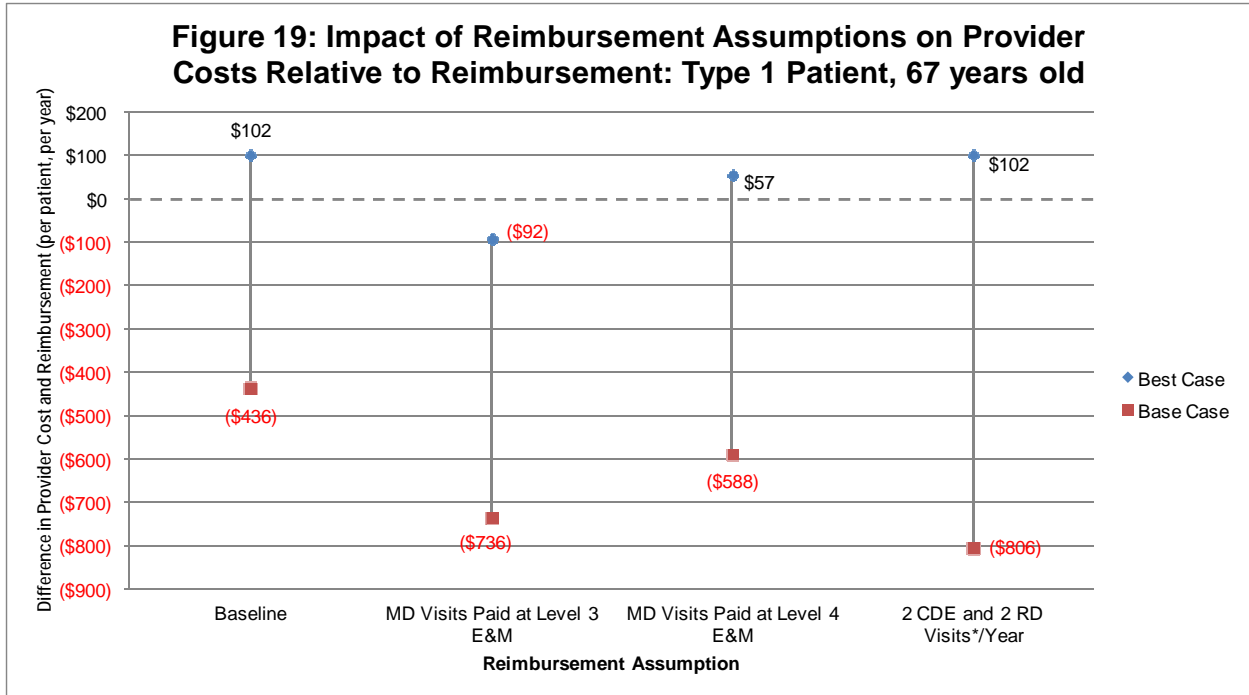


*Assumes each visit is 60 minutes.

Figure 18: Impact of Reimbursement Assumptions on Provider Costs Relative to Reimbursement: Type 1 Patient, 16 years old



*Assumes each visit is 60 minutes.



*Assumes each visit is 60 minutes.

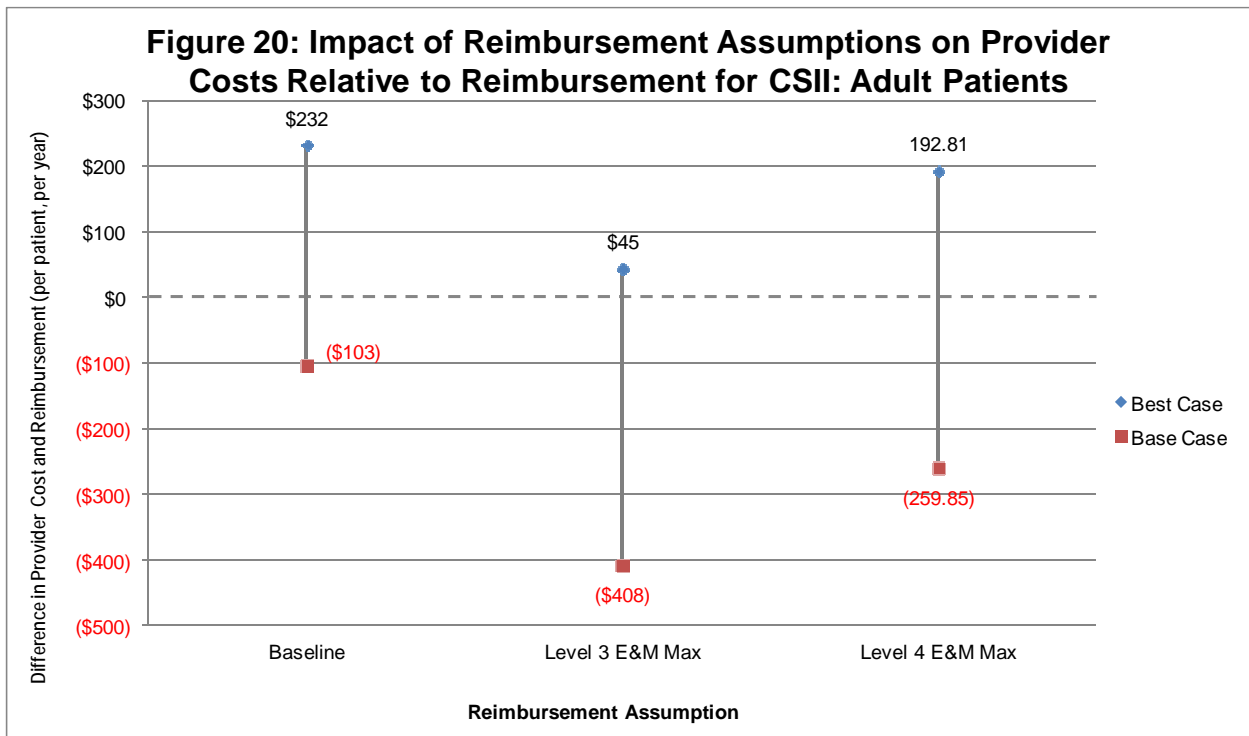


Figure 21: Impact of Reimbursement Assumptions on Provider Costs Relative to Reimbursement for CSII: Pediatric Patients

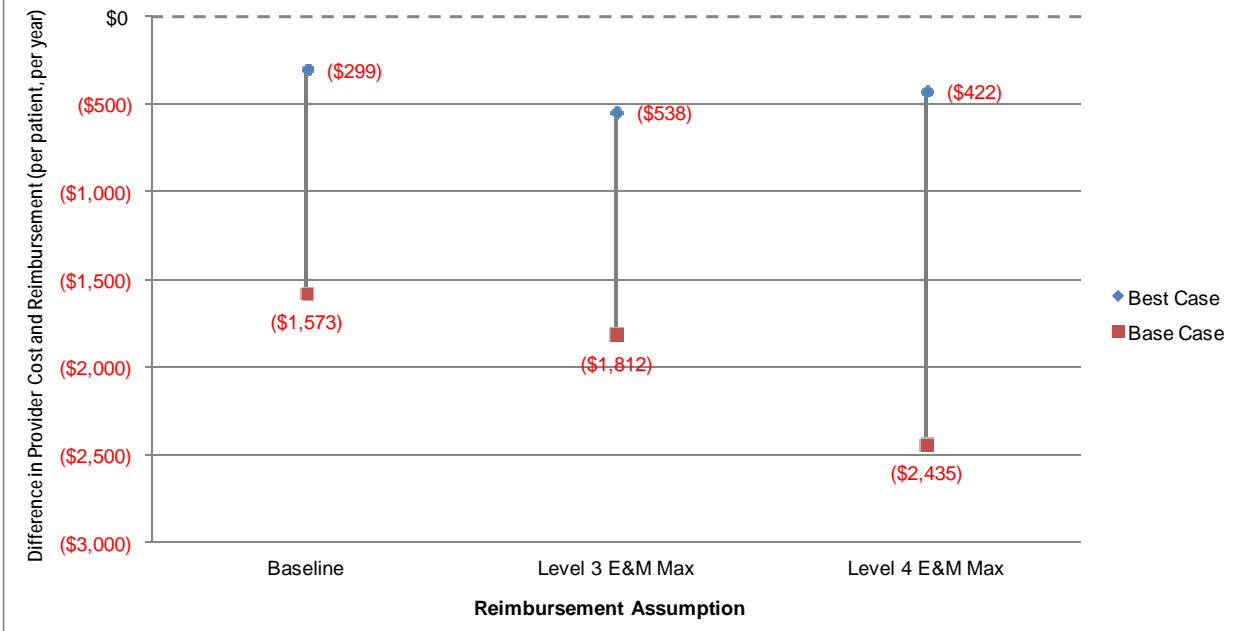
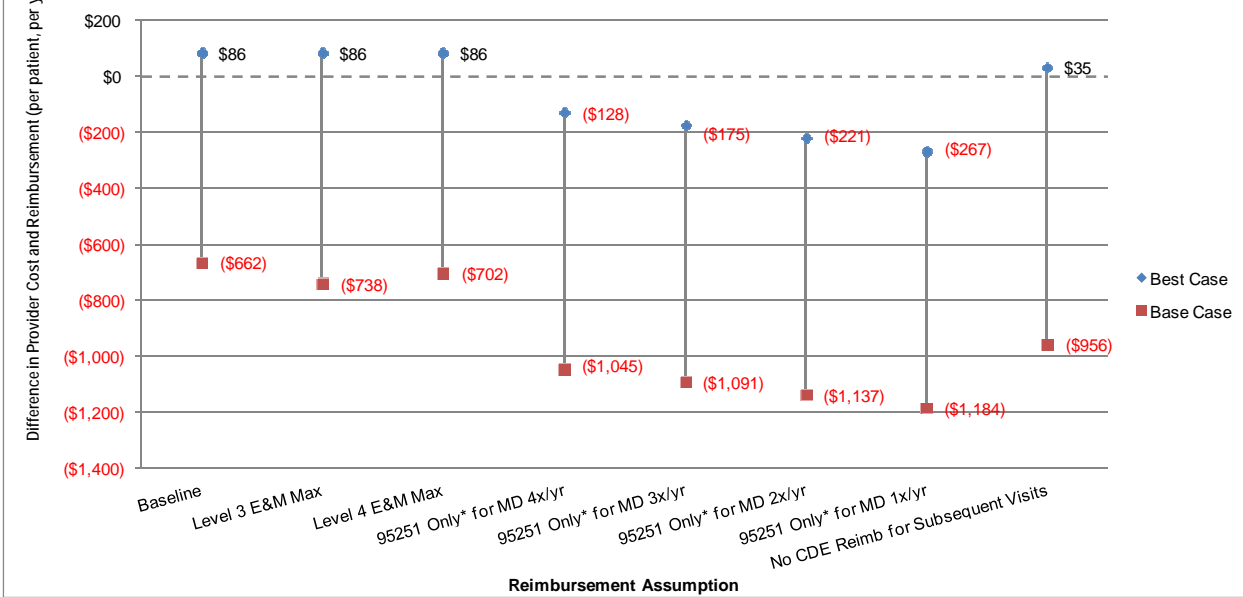
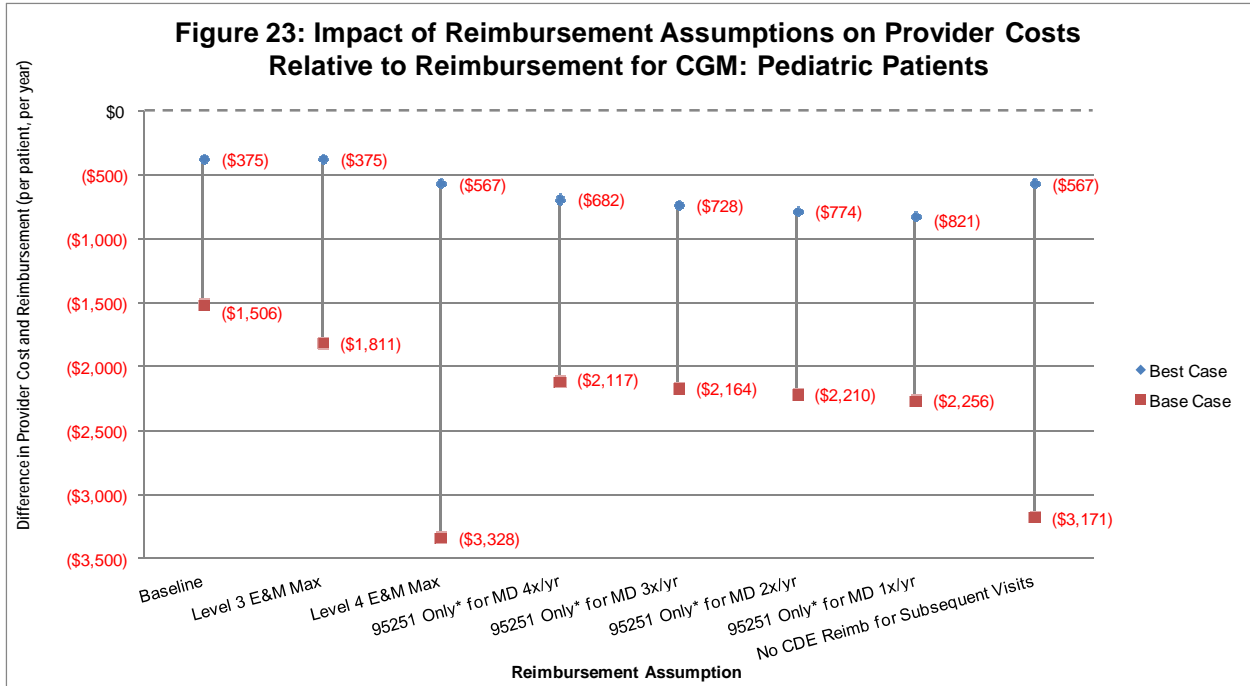


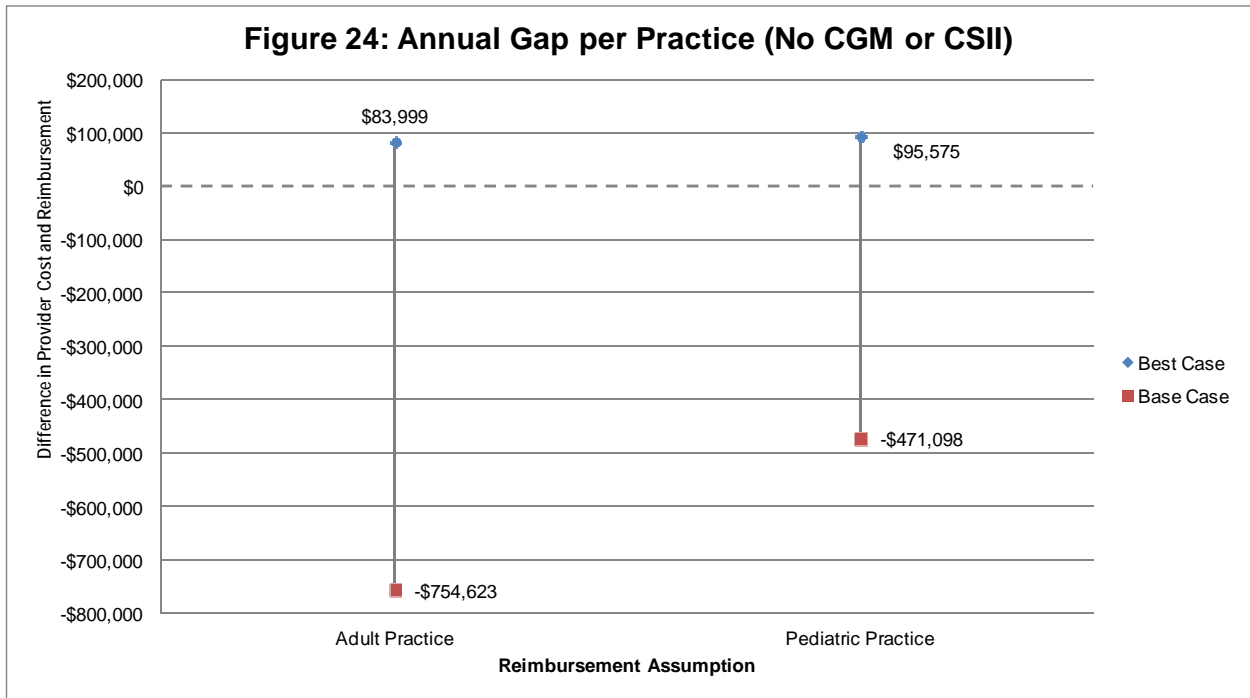
Figure 22: Impact of Reimbursement Assumptions on Provider Costs Relative to Reimbursement for CGM: Adult Patients

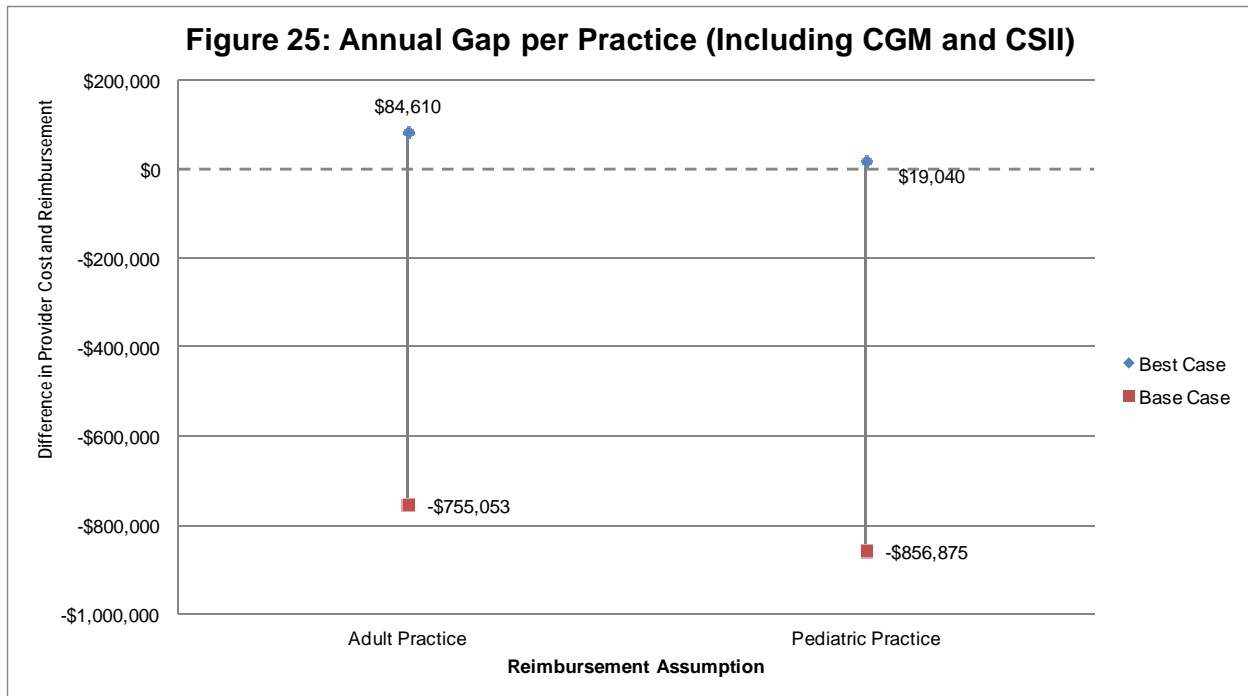


*No E&M services reimbursed.



*No E&M services reimbursed.





Discussion

The prevalence of diabetes, coupled with the broad and numerous complications resulting from untreated or poorly managed diabetes including heart disease and stroke, hypertension, blindness, kidney disease, neuropathy, amputations, and dental disease, yield significant costs to the overall healthcare system.³³ With the increasing costs and occurrence of diabetes and its complications, treatment is more important than ever, and successful treatment for people suffering from diabetes requires active participation from the patient and the healthcare delivery team to achieve desired outcomes. As evidenced in the provider survey conducted for this paper, compensation for care is a top provider barrier to providing standards-based care. Incentives must be aligned to ensure that providers are able to give their diabetes patients an optimal level of care. In particular, economic disincentives to providers spending the time required to optimize patient education and adherence must be addressed in order to achieve desired patient outcomes.

A model evaluating provider costs and reimbursement for services specified in national standards to achieve optimal patient outcomes demonstrates that, for most types of patients with diabetes, there is a gap between provider costs and reimbursement for treating patients with diabetes according to accepted standards. Under the base case scenario, the costs for treating diabetes patients in an adult practice would exceed reimbursement by more than \$750,000 per year. For a pediatric practice, costs would exceed reimbursement by more than \$471,000 per year. These gaps are increased for patients using intensive management technologies such as CSII and CGM. The model is highly sensitive to assumptions about

reimbursement for diabetes-related services, particularly for physician office visits. The gap between provider costs and reimbursement is substantially increased when current endocrinology office visit reimbursement patterns are assumed.

In interpreting results, several limitations should be considered. Time estimates are based on input from experienced diabetes providers. The expertise of the panelists is without question and the mixture of panelists was consistent with the provider teams recommended in national guidelines. However, it is not possible to determine whether a different panel of experts would have provided substantially different time estimates. Second, results are conservative and assume that all standards-based services included in the model will be covered by all payers, that providers will receive full reimbursement from third-party payers for the services provided, and that providers will be able to collect the full patient copayment/coinsurance amounts from all patients. Per the sensitivity analyses conducted, the model is sensitive to assumptions about coverage of services and level of reimbursement, and the gap between provider costs and reimbursement would increase significantly under differing assumptions.

Conclusions

The provider survey suggests that patient adherence, time with patients, and compensation for care are the top three provider barriers to achieving optimal diabetes care. The results of this modeling study support providers' perceptions that compensation for optimal diabetes care is inadequate, given the gap between provider costs and reimbursement for providing diabetes care consistent with national standards. Even using conservative assumptions regarding reimbursement, model results suggest that provider costs greatly exceed reimbursement for most patients when standards-based care is provided. This creates an untenable scenario in which providers are financially unable to meet the established standards of diabetes care to optimize blood glucose control and prevent or delay costly and debilitating complications. It is therefore imperative that alternatives to the current reimbursement system are explored and implemented to ensure that diabetes providers are able to provide the services necessary to ensure optimal diabetes patient outcomes.

Recommendations

Three key provider barriers to optimal diabetes care emerged from the original research conducted by the DWG through the provider survey and economic model. First, providers reported high incidence of between visit care delivered to patients in order to help them successfully self-manage their diabetes. Despite this additional time spent following-up with patients and providing supplementary care, providers cited lack of time with their patients as a primary barrier to meeting treatment guidelines and ensuring optimal patient outcomes. Furthermore, results of the economic model show that current fee-for-service reimbursement systems result in inadequate payment for the provider time required to provide optimal diabetes care. Both of these factors contribute to the barrier most often cited in the provider survey, patient adherence.³⁴

Creating systems with appropriate support and incentives for patients and providers to work together to achieve desired outcomes is key to achieving optimal patient outcomes and avoiding the debilitating complications and costs resulting from diabetes complications. Improving care for diabetes patients requires innovative approaches to removing obstacles faced by healthcare providers. Data from this study suggest that limitations on provider time and resources are critical obstacles to address. Below, we provide recommendations on overcoming the key provider barriers to optimal diabetes care identified through the DWG's research.

Recommendations are arrayed across three areas of provider engagement: care management, payment reform, and workforce supply.

Care Management

Patient adherence can be enhanced with improved care management focus

Diabetes is unique among chronic diseases in that, by definition, it requires a high level of engagement and self-management by patients. The ADA and AACE standards of care for diabetes include multiple components that require active patient participation, including adhering to medications, following a nutritious meal plan, and incorporating physical activity into a daily lifestyle.³⁵ However, the provider survey results identified “patient adherence” as the top ranking barrier to achieving the diabetes standards of care. This ranking is in-line with many studies demonstrating that patients with diabetes are much more likely to suffer adherence issues with their treatment than patients with other chronic diseases.³⁶ Because of this necessary patient adherence component, providers must include the patient's engagement as part of care and treatment. In fact, as noted in the provider survey discussion, improved patient adherence can be a direct result of more and better time spent by patients with their providers. Providers can modify their engagement level with their patients in multiple ways that can help to improve outcomes. These recommendations for providers include increasing the use of shared decision-making opportunities with patients in the office setting, leveraging existing health information technology (HIT) tools to better assist patients and monitor performance, and creating strong provider teams and sharing the roles and expectations of these teams with patients.

Incorporating shared decision making and HIT tools into care management of diabetes patients is key to increasing their success

Recommendation: Increase use of shared decision-making opportunities with patients in the office setting to maximize patient engagement in self-management of diabetes.

Because diabetes is essentially a self-managed disease, patients need to find motivation to actively participate in their treatment. To help address the patient adherence barrier cited in the provider survey, providers can help patients become more active in their own care by proactively incorporating a shared decision-making approach as they explain the treatment options and recommendations. This approach places the patient as the primary decision maker and requires the provider to collaborate directly with the patient to understand the benefits and implement the steps of the treatment approach.

A key component to shared decision-making is the assurance that patients are aware of and understand the standards of care that are the basis for measurement. The provider survey found that a strong majority of diabetes care providers follow the recommended standards of care by AACE and ADA. Reviewing these diabetes care standards explicitly with their patients may help ensure patient adherence. In doing so, providers can gain confidence that patients understand what they are being measured on, how they will be measured, and why such measurements are important to managing their diabetes. This heightened understanding has been shown to increase patient motivation to reach treatment goals that are their own, rather than their provider's.³⁷

A collaborative, shared decision-making approach, combined with explicit review of the diabetes standards of care, offer providers an opportunity to increase their patients' buy-in with their personal care and become more engaged to work towards these goals. While additional studies to identify key elements in approaches to diabetes care that should be highlighted to achieve the greatest patient benefit and the minimal provider burden are needed, such an approach is not unique to diabetes, but the results will directly aid in increased patient adherence.

Recommendation: Leverage existing HIT tools fully to assist patients in diabetes self-management and track performance.

Technology has become an increasingly important component of healthcare, as many stakeholders recognize it allows for a highly efficient and reliable means of exchanging information between providers, patients, and payers. Providers can incorporate a variety of HIT tools into their practices that can help their patients to stay engaged and adhere to their treatment plan.

The use of electronic prescribing has increased dramatically in recent years. At the end of 2009, more than 156,000 providers, 25% of all office-based prescribers, issued prescriptions electronically, up 109% from the 74,000 in 2008.³⁸ The benefit to patients is immediate, as

electronic prescribing removes the need for patients to deliver hard copy prescriptions to their pharmacy and wait for them to be filled.

Further, electronic prescribing can allow providers to monitor that their patients are actually picking up their medications, an early step in patient adherence. Email and texting alerts can be sent to patients to remind them of pending prescription pickups, and studies have found that electronic reminder systems help reinforce these habits.³⁹ Both private payers and the Centers for Medicare and Medicaid Services (CMS) offer guidance on standards utilized in such systems and implementation of them.

Patient registries offer another opportunity to utilize HIT and allow for greater access to information. Patient registries can capture patient data to better monitor trends in diabetes and provide information on how best to utilize resources to care for these patients.⁴⁰ Communication is another strong component of patient registries and can allow patients and providers to connect in coordinated fashion. Registries require a coordinated effort among a broad range of stakeholders to build and maintain the data. But recent emphasis on coordinated care models that are being piloted and adopted by both CMS and private payers may provide an opportunity for patient registries to be designed and implemented in a coordinated and more comprehensive fashion. Models such as accountable care organizations (ACOs) and patient-centered medical homes (PCMHs) are currently promoted across the healthcare landscape. Each of these models includes a strong need to collect and share information and data on their patient populations, and a successful model would likely lead to increased financial rewards for the providers participating.

While these tools hold promise, it is important to acknowledge the challenges associated with adopting HIT tools. While these tools can ultimately help providers improve patient adherence and create efficiencies by increasing the quantity and quality of time spent with patients, it takes significant investment to achieve these goals. Existing technology is promising but not perfect, particularly in addressing the specific challenges facing diabetes providers. Therefore, funding and training to support their implementation will be critical to achieve wide-spread adoption. While these challenges are significant, a number of current federal and state initiatives are focused on addressing these challenges, and over time these and other initiatives may be successful in promoting HIT tools and achieving broad provider acceptance.

Recommendation: Create strong provider teams and share roles and expectations with patients.

The diabetes standards of care include the consistent recommendation to develop a solid core provider team that can provide the comprehensive care outlined in these standards. The baseline core team includes a physician, a nurse, a dietician, and a certified diabetes educator (CDE). Other team members that can assist with care include a podiatrist, a pharmacist, and a psychologist or social worker.⁴¹ Each of these provider types manages aspects of the standards of care such as glucose monitoring, diabetes self-management education (DSME), nutrition therapy, and psychosocial assessment and care.

The benefits of this team approach are numerous. Studies show that short-term benefits can include reduced hospital inpatient stays and reduced rates of hospital readmissions and related costs.⁴² Long-term benefits of this multidisciplinary approach include lower A1C values and reductions in eye disease, kidney disease, and nerve damage.⁴³ However, to achieve these results, a strong core provider team must be built and fully utilized. Indeed, the provider survey ranked “team coordination” as a consistent barrier to providing optimal care.

To build and implement diabetes care teams broadly, providers can look to their professional societies to define those aspects of the standards of care within their responsibilities, then build collaborative relationships with other team providers and societies to align their goals and objectives. Each provider group within the core team has an active professional society to support these efforts and assist with the necessary collaboration and support to enhance this team approach.

Numerous challenges arise when building a core team, ranging from the size of the provider practice (e.g. single decentralized provider vs. large group clinic), to geographic location (urban vs. rural provider demographics). A coordinated approach among stakeholders to address these variables will be needed, and such efforts can best be supported by the professional societies representing key diabetes providers. The ACO and PCMH models being developed also hold key lessons in building alliances between providers to meet these challenges.^{44,45}

Finally, promoting this core provider team heavily and explicitly to patients is key to success. Similar to the shared decision making approach, it is important for providers to explain and patients to understand the specific members of the core team as well as the aspect of care within each provider’s responsibility. In addition, patients need to be made aware that all care team members are available to help them with their diabetes self-management and that it is appropriate to seek assistance across their entire care team. This will allow the patient to become more engaged in seeking out appropriate and timely care, and also reinforces the shared decision-making previously addressed.

Payment Reform

Addressing payment inadequacies can positively impact provider barriers

The success of the recommendations for improving care management to help patients achieve optimal outcomes is tied to appropriately compensating providers for the care they deliver. The current fee-for-service model of reimbursement has been shown to be lacking, as evidenced by the results of the economic model built for this research. In addition, literature supports that more appropriate payment for diabetes providers results in better patient care.⁴⁶ Finding innovative ways to pay appropriately for the time, effort, and resources required to meet the accepted standards of care for diabetes and to ensure quality of care delivered are key to achieving sensible payment reform.

The provider survey and economic model completed for this paper both reveal barriers that could be significantly reduced through reforms to current fee-for-service payment systems. The survey results highlight that providers need more time with patients to provide optimal care, and the model reveals that providers are not adequately reimbursed for the time necessary to provide optimal diabetes care. About 95 percent of survey responders indicated their practices provide between visit care, often uncompensated, delivered via email or over the phone, and this care is rarely, if ever, reimbursed. In addition, despite the prevalence of between visit care 38 percent of survey participants selected “time with patient” as a top barrier to providing optimal diabetes care. Thus, providers are already providing care that is not compensated and still feel they need more time with patients. These findings are further supported by the economic model completed for this paper, which demonstrates that under current reimbursement scenarios, provider costs greatly exceed reimbursement for most patients with diabetes when standards-based care is provided. These gaps are increased for patients using intensive management technologies such as CSII and CGM.

Published research supports that changes in payment models that better align payment system incentives with desired patient outcomes can both improve outcomes and decrease costs. For example, a study from 2004 examining an approach to improving reimbursement for highly specialized, comprehensive pediatric diabetes management showed that contracting with third-party payers for pediatric diabetes intensive case management services reduced costs by reducing emergency department and inpatient hospital utilizations.⁴⁷ The study found that this approach allowed for intensive education and immediate access to the diabetes care team for crisis management, which decreased hospitalizations. Another recent study examined provider perception of the adequacy of reimbursement and confirmed that physicians perceive current reimbursement for diabetes care as too low for the care provided.⁴⁸ The study hypothesizes that inadequate reimbursement limits provider ability to perform all the tasks necessary to deliver comprehensive diabetes care.

A payment system that rewards spending the time necessary to optimally manage a patient's care whether face-to-face or remotely would create more rational alignment between economic incentives and desired patient outcomes, and would help address key provider barriers related to time with patients and compensation. Moreover, a payment system that improves outcomes such that diabetes complications can be avoided has the potential for enormous long-term cost savings for the health care system.⁴⁹

A broad spectrum of payment solutions is necessary to fully address provider barriers

Recommendation: Appropriately reimburse providers for meeting standards of care in treating their patients by paying adequately for all services delivered

Optimal diabetes care requires focused time devoted to treating patients by a team of health care professionals. As seen in both the provider survey, where over half of the respondents reported spending at least 10 hours weekly providing uncompensated between visit care, and the economic model which predicts that, outside of the most ideal of circumstances, the amount of time required to meet the current standards of care is vastly undercompensated, current fee-

for-service arrangements do not adequately reimburse for diabetes care. The problem in the current fee-for-service system is twofold. First, much of the care delivered to diabetes patients is either not described by existing Current Procedural Terminology (CPT) codesⁱⁱⁱ that determine coverage and payment, is considered by payers to be included or “bundled” into existing CPT codes used to report services^{iv}, or is described by existing CPT codes that are not covered or reimbursed by payers.^v Secondly, in cases where codes do exist to describe the work of treating diabetes patients, the associated payments are often insufficient, particularly given the amount of staff needed to provide appropriate diabetes care. Both of these problems are exacerbated in the case of diabetes care since, as reported by providers in the survey, so much non-face-to-face care is delivered to patients with diabetes. Except for rare cases, payers do not reimburse providers for non-face-to-face care, such as the time they spend calling and emailing patients and caregivers to discuss treatment adjustments.

In addition to these coding and coverage issues, reimbursement for existing codes used to bill for diabetes care is inadequate to cover the provider time required for standards-based care. Moreover, it is challenging for providers to obtain reimbursement when billing codes that would best represent the level of time and effort required to deliver standards-based care. Specifically, as noted in the economic model section, public and private payers routinely deny claims for the extended office visit billing codes. Similarly, claims for Level 5 office visits (which describe the longest and most complex visits) are routinely denied by payers, and providers who bill these codes routinely may be targeted for audits despite billing these codes in adherence with guidelines for office visit billing.^{50,vi}

Appropriately reimbursing providers for delivering optimal diabetes care can address key provider barriers related to lack of time and compensation and will increase the number of diabetes patients who have access to optimal care. To achieve this objective under the current fee-for-service system, it is essential that billing codes exist to describe the work being performed by diabetes providers and that the codes describing diabetes care are covered and paid adequately. Appropriately aligning reimbursement rates with the actual care delivered to patients can eliminate significant barriers in helping patients best manage their diabetes.

ⁱⁱⁱ No code exists to describe non-face-to-face care delivered to diabetes patients, such as phone calls to discuss adjustments to therapy or receiving, reviewing, and responding to blood glucose data emailed from a patient.

^{iv} The Level 4 Evaluation and Management code, 99214, a code typically billed for a diabetes-care visit, is considered to include the entire physical, review of lab results (such as A1c, lipids, etc), analysis of retrospective blood glucose data, review of medications (including basal and prandial insulin dosing), psychosocial assessment, nutritional and exercise counseling, and gender-specific needs, such as pregnancy planning or management. While many of these activities could be considered discrete services, for billing purposes they are all considered to be encompassed by the existing E&M code and associated payment rate.

^v CPT code 99091 *Collection and interpretation of physiologic data (eg, ECG, blood pressure, glucose monitoring) digitally stored and/or transmitted by the patient and/or caregiver to the physician or other qualified health care professional, requiring a minimum of 30 minutes of time* could theoretically be used to report time spent downloading and interpreting patients’ blood glucose meters, however it is not typically associated with any payment. For instance, this code is not recognized by Medicare and is not covered by most private payers.

^{vi} The American Medical Association issued Documentation Guidelines for Evaluation and Management Services in 2005 and 2007. Most payers, including Medicare, require providers to comply with either the 2005 or the 2007 guidelines when billing E&M services.

Recalibrating the baseline reimbursement for delivering optimal diabetes care is also important to the success of any new payment and care delivery model for diabetes, as those payment models will likely build off of existing fee-for-service payment rates.

Recommendation: Test and implement payment models that reward providers for supplying optimal care to patients with diabetes.

Certain barriers faced by providers when supplying care to patients could be removed by adjusting how diabetes care is reimbursed. By improving efficiency and supporting the delivery of high-value services, modifications to the reimbursement system for diabetes care may lead to lower overall costs and improved patient outcomes. Providers and payers should work together to test and implement innovative payment models for diabetes care that would provide appropriate reimbursement for the services supplied in order to provide optimal patient care.

Several payment models currently being tested or implemented by public and private payers provide opportunities to improve patient outcomes while also creating efficiencies in the delivery of diabetes care. However, in order to achieve the desired results, the following key principles must be followed when applying these existing payment models to diabetes care:

- The payment system must appropriately account for provider time required for optimal patient care, including between visit care.
- The payment system must incentivize and enable the use of a coordinated and multi-disciplinary team.
- The payment system must incentivize and enable the provision of all services outlined in national standards for diabetes care.
- The payment system should be sufficiently flexible to account for expected variations in patient demographics, disease severity, and comorbidities.

New payment systems for diabetes care need to be tested to ensure that they appropriately adhere to the principles outlined above. It is important to note that one payment system may not be best for all providers and patients, and different payment options may be necessary to achieve the goals of improved outcomes and increased efficiency.

Examples of specific payment systems that should be explored for diabetes care are discussed below.

Potential Model: Episode of Care

Episode of care payment allows for reimbursement of multiple services at one time covering different types of providers and different types of care. It can also create efficiencies in providing care by encouraging provider teams to work within a set amount of funding for each care episode provided to a patient. Unlike the current fee-for-service system, an episode of care payment system for providing diabetes care services consistent with accepted standards would provide funding that could be allocated among different providers depending on the needs of the patient.

Important to such a payment model are quality measure requirements to help ensure patients are receiving optimal care. In addition, episode of care payment should recognize differences in patient populations by applying case mix adjusters to account for patients with multiple comorbidities and other factors affecting the level of care needed. Most importantly, an episode of care must be properly designed to include the routine services specified in standards of care, but exclude non-routine services and services unrelated to diabetes. Moreover, different episodes may need to be developed, for example separate episodes for type 1 and type 2 diabetes, or unique episode-based payments for pediatric patients.

Additional research is needed to determine the optimal structure of these systems. Several pilot programs of diabetes episode of care payments are underway, and many publications have touted the potential of these systems to improve outcomes while maintaining or reducing costs. One of the most visible examples is the PROMETHEUS Payment[®] model for diabetes, and several pilot tests of this system are underway; however, results have not yet been published.⁵¹ Moreover, it has been acknowledged that the PROMETHEUS model is not appropriate for all providers and that their results have not been proven over time in a range of settings.⁵²

Potential Model: Patient Management Fee

As noted earlier, the current fee-for-service system lacks appropriate codes that do not exist to cover between visit care or other services identified in the economic standards of care as necessary to provide optimal care. Similarly, justifying E/M codes to payers for services that take longer than expected can be a difficult process.

One alternative to this current model of billing separate codes is a monthly per-patient payment for all care. Such a per patient management fee would facilitate the provision of the extensive care coordination, education, and training services required to successfully manage patients with diabetes. The fee would cover the various patient management activities required to achieve optimal patient outcomes, including care provided between visits such as over the phone and email.

Some payment systems already feature a monthly per-patient management fee approach. One example is Connecticut's Medicaid Managed Care Program, Health Care for Uninsured Kids and Youth (HUSKY). Under HUSKY, physicians are reimbursed a set amount per month for each patient under their care. In another example, Medicare pays nephrologists treating End Stage Renal Disease (ESRD) patients in an out-patient setting under a monthly capitated payment (MCP). Under the MCP, nephrologists are paid a certain amount each month depending upon whether the patient has one, two or three, or four or more visits per month. Though not a true capitation payment because of the varying rate based on the number of monthly visits, the ESRD MCP is a modified capitation approach because the actual physician time spent and services provided by the nephrologist is not differentiated in final reimbursement.

Important for success is setting an initial monthly management fee that includes funds for both E/M visits and between visit care. The payment would also need to account for the

multidisciplinary team required for optimal care, allowing for education services from diabetes educators, nutritionists, and dieticians as appropriate. This model would also need to include a pay for performance element to reward providers for providing optimal care. Payment for acute services and all other services unrelated to routine diabetes management must remain separate. A per-patient management fee, in addition to payment for acute services, would allow providers to spend the time necessary to optimally manage patients by offering appropriate reimbursement for the services provided.

Potential Model: Patient-Centered Medical Home

Applying the patient-centered medical home model to diabetes is another possible option to encourage care coordination, align reimbursement incentives, and incorporate quality measures benefiting the patient. The patient-centered medical home concept promotes the role of the patient's primary provider in supplying patient-centered preventive services. According to the 2007 Joint Principles of the Patient-Centered Medical Home published by the Patient Centered Primary Care Collaborative, a medical home is "a physician-directed practice that provides accessible, continuous, comprehensive, and coordinated care that is delivered in the context of family and community."⁵³ Extensive experimentation with the medical home model is ongoing, including a number of programs focused on diabetes care. Initial evidence suggests that such a model has potential benefits for patients, providers, and payers.^{54,55} A range of diabetes medical home pilots are underway throughout the country, sponsored by states, private payers, and employers, with positive results reported.⁵⁶ A number of new Medicare and Medicaid medical home pilot programs were recently announced by the CMS Center for Medicare and Medicaid Innovation, which although not diabetes specific, may provide additional insight into the value of this model for diabetes patients and providers.⁵⁷

Unlike current primary care-focused models, diabetes-focused medical homes would center exclusively on diabetes care. The current diabetes payment system does not allow flexibility for many providers to have coordinated teams on site and does not reward providers for care coordination activities. An appropriate diabetes medical home-based payment system would place value on the services necessary to provide optimal diabetes care (e.g., between visit care and patient education). As with the other models, an ideal medical home system will include quality measures to ensure providers are meeting care guidelines.

In summary, the potential payment and care delivery models discussed above are not mutually exclusive, nor do they represent the entire universe of possibilities for innovative approaches to optimizing diabetes care. Testing a variety of systems that meet the key elements of appropriately compensating all types of providers and the breadth of types of care involved in optimal diabetes management, while monitoring the quality of care delivered and outcomes achieved is essential to establishing delivery and payment models that can be widely used for diabetes patients.

Workforce Supply

Increased demand for provider workforce must be met with viable supply solutions

The economic model revealed the extensive amount of time needed from a comprehensive care team to deliver optimal diabetes care. The survey identified time with patients as a key provider barrier, and this lack of time can directly affect the top provider barrier identified – patient adherence.⁵⁸ To increase the amount of provider time with patients and to expand patient access to a variety of providers across a comprehensive care team requires addressing a third key area: provider workforce supply.

The current supply of diabetes providers, including both physician and non-physician providers, is inadequate to meet the demands of patients with diabetes today. Current wait times for appointments range from three to nine months, and many practices are closed to accepting new diabetes patients.⁵⁹ As the incidence and prevalence of diabetes is only expected to increase, this supply shortage of diabetes care professionals will likely be exacerbated.⁶⁰ A larger pool of diabetes educators, physicians, and other allied health professionals who have specific training, skills, and experience in working with patients with diabetes is necessary for the care management and innovative payment system recommendations to be successful.

Incentives to expand workforce supply are a necessary investment

Recommendation: Work to make diabetes care an attractive choice for new medical professionals through educational loan forgiveness.

Educational expense is a significant burden for many health care professionals. Leaving medical school, nursing school, and other training programs with significant educational loan debt contributes to new medical professionals' decisions regarding specialization. The reputation of diabetes care as an underpaid profession may dissuade providers from seeking to enter that specialty as they face looming debt repayment. Therefore, implementing educational loan forgiveness programs for health care providers choosing to specialize in diabetes care can also help alleviate workforce supply shortages. For physicians, these programs could operate in a manner similar to existing federal government loan forgiveness programs for primary care physicians and physicians who work in rural and underserved areas. These programs have been shown to improve supply for the specialties and geographic areas targeted. Offering similar types of loan forgiveness programs and other financial assistance to individuals working to become certified diabetes educators and for nutritionists and dietitians specializing in diabetes patient care is equally critical.

Educational loan forgiveness programs for diabetes professionals could be implemented by a number of state and federal government agencies as well as private sector organizations. Examples include federal health care agencies such as the Health Resources and Services Administration, which currently operates several such programs, and state medical societies. Educational institutions could work to implement loan forgiveness programs for their graduates that choose to specialize in treating patients with diabetes and funding could be sought from non-profit foundations and trusts.

Recommendation: Promote the importance of providing optimal diabetes care as an essential aspect of the healthcare system.

The burden of diabetes care in the US is large and growing. As Boyle et al state in their article projecting the future burden of diabetes in the United States, “Effective strategies will need to be undertaken to moderate the impact of these factors on national diabetes burden.”⁶¹ Another key step to making diabetes care the career of choice for nursing, nutrition, and medical students is for current diabetes care professionals to promote the positive attributes of working with diabetes patients. First, highlighting the fact that as more and more Americans are diagnosed with diabetes, professionals who work to keep diabetes patients healthy and productive will have a positive impact for those patients and society at large and also can give appropriate context to the invaluable role of diabetes care providers. Further, creating outreach programs for current diabetes care professionals to share the aspects of their job that are rewarding (e.g., seeing patients successfully manage their diabetes based on training they’ve delivered) with people considering a career in healthcare can also increase interest in diabetes care as a profession. Professional societies for diabetes care providers should work with medical schools and allied health professional training programs to increase students’ exposure to the positive attributes of working with diabetes patients.

Recommendation: Expand access to diabetes modules to educate primary care providers on treatment of diabetes.

The vast majority of people with diabetes receive their healthcare from primary care providers and not diabetes specialists. While some patients require the assistance of a specialist to manage their diabetes, others can be managed appropriately by primary care providers. Since healthcare providers receive minimal diabetes training in their general training (medical school residency for physicians, nursing school for registered nurses, etc.), diabetes specialists are well-suited to create training opportunities for non-specialists (e.g., primary care physicians, general practitioners, gerontologists, nurse practitioners, physician assistants, etc.) to learn how to deliver optimal care to their patients with diabetes is an effective way to increase the supply of providers equipped to treat patients with diabetes. Endocrinologists, diabetes educators, and other diabetes specialists can work to develop trainings for various healthcare professionals to provide them with the skills necessary to engage in shared decision making with their diabetes patients, appropriately manage diabetes treatments including insulin therapy, and to form comprehensive diabetes care teams for their patients. This training approach will expand the skills of existing healthcare professionals and reduce the diabetes workforce supply issues independent of adding additional providers to the system.

In summary, expanding the number of new professionals entering diabetes care specialties as well as increasing the number of practicing healthcare professionals trained in diabetes care will help to alleviate workforce supply shortages. If workforce issues are not addressed, it is unlikely that other efforts to improve diabetes care by alleviating provider barriers will be successful. Diabetes care providers identified lack of time with patients as a central obstacle to providing

optimal diabetes care. Unless more providers are available to spend time with diabetes patients to assist them in becoming proficient in self management, this barrier will persist.

Appendix A: Diabetes Provider Survey

The Diabetes Working Group Research Study on Barriers to Achieving Optimal Patient Care Outcomes

The Diabetes Working Group is a collaborative group of organizations and individuals committed to improving care and outcomes for people with diabetes in the United States.

*** Thank you for your interest in this study ***

Please read the following instructions:

- This survey should take you approximately 10 minutes to complete.
- The Diabetes Working Group is comprised of representatives from the leading Diabetes organizations in the United States as well as thought-leading physicians, including the American Academy of Pediatrics, American Association of Clinical Endocrinologists, American Association of Diabetes Educators, American Diabetes Association, diaTribe, Endocrine Society, Juvenile Diabetes Research Foundation, Lawson Wilkins Pediatric Endocrine Society, Dr. Bruce Bode, Dr. Irl Hirsch, Dr. Dan Einhorn, and Dr. William Tamborlane.
- Your responses to this survey are confidential. Survey results will be reported in aggregate only, and no individual participants or responses will be identified.

1. Have you already taken this survey?
 - a. Yes **[TERMINATE]**
 - b. No
2. Which of the following best describes you?
 - a. I am a physician
 - b. I am a non-physician health care provider
3. On average how many diabetes patients do you see in a week?
 - a. Please specify _____ **[SPECIFY] [LIMIT 5 CHARACTERS]**
4. Which of the following best describes the type of diabetes patients under your care?
 - a. Type I diabetes patients
 - b. Type II diabetes patients
 - c. Both
5. Which of the following best describes the age of the patients you care for?
 - a. Adult diabetes patients
 - b. Pediatric diabetes patients
 - c. Both adult and pediatric diabetes patients
 - d. None of the above **[TERMINATE]**

[IF 2=b or c, INCLUDE PEDIATRIC QUESTIONS]

6. What is your primary medical specialty?
 - a. Endocrinologist
 - b. Internal Medicine Physician
 - c. General / Family Medicine Physician
 - d. Registered Nurse
 - e. Advance Practice Nurse
 - f. Physician Assistant
 - g. Registered Dietitian
 - h. Pharmacist
 - i. Certified Diabetes Educator (CDE) or Board Certified Advanced Diabetes Management (BC-ADM)
 - j. Other, specify _____ **[SPECIFY] [LIMIT 20 CHARACTERS]**

7. Which of the following best describes your practice/employment arrangement?
 - a. Solo practice
 - b. Group practice (2-4 MDs)
 - c. Group practice (5 or more MDs)
 - d. Staff at community non-teaching hospital
 - e. Staff at community teaching hospital
 - f. Staff at a university teaching hospital
 - g. Staff at HMO or other private plan
 - h. Accredited or Recognized Diabetes Education Program
 - i. Employed by diabetes manufacturer
 - j. Other, specify _____ **[SPECIFY] [LIMIT 20 CHARACTERS]**

8. How would you characterize your primary practice setting?
 - a. Private clinic or office
 - b. Hospital outpatient/satellite clinic
 - c. Hospital inpatient based
 - d. Military/VA health system or clinic
 - e. Public Health Clinic/Federally Qualified Health Center
 - f. Indian Health Services clinic
 - g. Community setting
 - h. Other, specify _____ **[SPECIFY] [LIMIT 20 CHARACTERS]**

9. Do you use the American Diabetes Association's (ADA) or the American Association of Clinical Endocrinologist's (AACE) standards of diabetes care, all or in part, when treating diabetes patients?
 - a. Both
 - b. Neither
 - c. ADA only
 - d. AACE only

[IF 9=a, c, or d, SKIP TO 11]

10. Why do you not use the ADA or AACE standards to diabetes care when treating diabetes patients?
- a. Time consuming
 - b. Unaware such standards exist
 - c. Use other standards, specify _____ **[SPECIFY] [LIMIT 75 CHARACTERS]**
 - d. Other, specify _____ **[SPECIFY] [LIMIT 20 CHARACTERS]**

[SKIP TO 14]

11. How often do you meet the ADA and/or AACE diabetes standards of care with each patient?
- a. Always
 - b. Sometimes
 - c. Never

[IF 11=a, SKIP TO 14]

12. Do you feel that any of the following prevent you from consistently meeting the diabetes standards of care? Please select and prioritize all that apply.
- a. Coordination with other diabetes care providers
 - b. Compensation for care
 - c. Patient Adherence
 - d. Time with patient
 - e. Training
 - f. Other, specify _____ **[SPECIFY] [LIMIT 20 CHARACTERS]**
 - g. Other, specify _____ **[SPECIFY] [LIMIT 20 CHARACTERS]**

13. If desired, please elaborate on barriers you face to meeting the standards of care with patients.

[LIMIT 300 CHARACTERS]

14. Which of the following best describes your work environment/structure?
- a. I work in a practice with a team of diabetes care providers including (check all that apply):
 - i. Primary Care Physician
 - ii. Endocrinologist
 - iii. Nurse
 - iv. Diabetes Educator
 - v. Registered Dietitian
 - vi. Eye Doctor
 - vii. Social Worker/Psychologist/Psychiatrist/Marriage and Family Therapist
 - viii. Podiatrist
 - ix. Dentist
 - x. Exercise Physiologist
 - xi. Other, specify _____ **[SPECIFY] [LIMIT 20 CHARACTERS]**

- b. I do not work in a practice with a team of diabetes care providers but I regularly refer patients to diabetes care providers outside of my practice including (check all that apply):
 - i. Primary Care Physician
 - ii. Endocrinologist
 - iii. Nurse
 - iv. Diabetes Educator
 - v. Registered Dietitian
 - vi. Eye Doctor
 - vii. Social Worker/Psychologist/Psychiatrist/Marriage and Family Therapist
 - viii. Podiatrist
 - ix. Dentist
 - x. Exercise Physiologist
 - xi. Other, specify _____ **[SPECIFY] [LIMIT 20 CHARACTERS]**
 - c. I do not work with or consult with other diabetes care providers
15. Does your practice instruct patients how to self-monitor blood glucose by training them to use devices (discreet or continuous monitors or sensors)?
- a. Yes
 - b. No
16. Does your practice instruct patients how to use their blood glucose data to adjust their therapy?
- a. Yes
 - b. No
17. How much time does your practice spend providing diabetes care to patients between office visits (E.g., emails, phone calls)?
- a. None
 - b. ≤ 5 hours per week
 - c. 5-10 hours per week
 - d. 10-15 hours per week
 - e. 15-20 hours per week
 - f. More than 20 hours per week

[IF 17=a, SKIP TO END]

18. What members of your practice typically conduct between-visit follow-up with patients (if offered)?
- Endocrinologist
 - Internal Medicine Physician
 - General / Family Medicine Physician
 - Registered Nurse
 - Advance Practice Nurse
 - Physician Assistant
 - Registered Dietitian
 - Pharmacist
 - Certified Diabetes Educator (CDE) or Board Certified Advanced Diabetes Management (BC-ADM)
 - Other non-health care provider office staff

[PEDIATRIC QUESTIONS]

- What is the average amount of time you spend in the education of school nurses/teachers or non-parent providers?
 - None
 - ≤5 hours per week
 - 5-10 hours per week
 - 10-15 hours per week
 - 15-20 hours per week
 - More than 20 hours per week
- What is the average amount of time in minutes you spend with a new pediatric diabetes patient?
 - Please specify _____ **[SPECIFY] [LIMIT 20 CHARACTERS]**
- What is the average amount of time in minutes you spend when starting a pediatric patient on an insulin pump?
 - Please specify _____ **[SPECIFY] [LIMIT 20 CHARACTERS]**
- What is the average number of patient per year you refer for psychological support?
 - Please specify _____ **[SPECIFY] [LIMIT 20 CHARACTERS]**
- Do you work with support groups as part of providing care to your pediatric diabetes patients?
 - Yes
 - No
 - Other, specify _____ **[SPECIFY] [LIMIT 75 CHARACTERS]**
- Do your patients experience problems with the transition to adult diabetes care?
 - Yes
 - No

[IF 6=b, SKIP TO END]

7. Please elaborate on the problems your patients face when transitioning to adult care.
[SPECIFY] [LIMIT 250 CHARACTERS]

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Appendix B: Standards of Care Economic Model Panel Members

Several panels of three to ten diabetes care professionals were convened to estimate the minimum and maximum time (in minutes) needed by a professional in each of the job categories to provide care in a way that would result in achievement of each care standard. The following is a list of individuals who participated in one or more of the panels convened.

- Bruce Bode, MD
- Bruce Buckingham, MD
- David Gardner, MD
- Deborah Greenwood, CDE
- Irl Hirsch, MD
- James Rosenzweig, MD
- Joyce Lee, MD
- Lisa Fish, MD
- Martha Price, CDE
- Mary Korytkowski, MD
- Nancy Bohannon, MD
- Robert Gabbay, MD, PhD
- Robert Vigersky, MD
- Stephen Gitelman, MD
- Stuart Brink, MD
- Stuart Weinzimer, MD
- Suneil Koliwad, MD
- William Tamborlane, MD

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